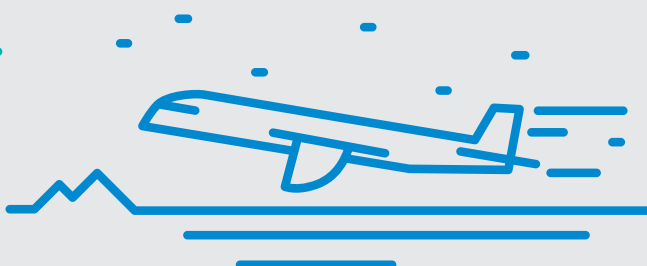


BUILDING A JUST TRANSITION TOWARDS A SMART AND SUSTAINABLE MOBILITY



This document was prepared for IndustriAll European Trade Union and the European Transport Workers' Federation (ETF) by the consultancy company Spin360 S.r.l in the framework of the project 'Building a Just Transition towards a Smart and Sustainable Mobility', also known as "JT4Mobility". The project is financed by the European Commission. Exclusive responsibility for this publication lies with project's partners. The European Commission assumes no responsibility for any use possibly made of the information contained here.

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FOREWORD

Our sectors and the 20 million workers employed in the mobility production and transport segments of the mobility industry are at the proverbial coalface of the fight against climate change. Together we established a Coalition for Just Transition for mobility workers in 2021 – workers should not be left to manage the changes underway without the rights, tools or resources needed.

We are increasingly in the spotlight of European and national policy and regulatory attention. Alongside the 2019 European Green Deal and the Climate Law, in December 2020, the European Commission published its Sustainable and Smart Mobility Strategy. Accordingly, the transport sector must deliver a 90% reduction of transport greenhouse gas emissions by 2050, with a Just Transition for workers and their communities¹.

Emissions related to transport are responsible for 27% of the total greenhouse gas emissions of the EU-27+UK and road transport represents more than 70% of transport emissions within the EU-27+UK. According to official data, emissions from road transport were 26.8% higher in 2018 than they were in 1990². At the same time, demand for different transport modes is growing. This steadily growing demand for mobility must be met in the future without burning fossil fuels, such as petrol and diesel.

According to the European Commission strategy, by 2030, at least 30 million zero-emission cars will be on European roads, 100 European cities will be climate neutral, high-speed rail traffic will double across Europe, the level of sustainable aviation fuel consumption will increase, scheduled collective travel for journeys under 500 km should be carbon neutral and zero-emission marine vessels will be market-ready. By 2035, zero-emission large aircraft will be market-ready and by 2050, nearly all cars, vans, buses, as well as new heavy-duty vehicles, will be zero emission.

The shift to a carbon-neutral mobility is going hand-in-hand with the further digitalisation of the whole transport system. For instance, the European Commission forecasts that automated mobility will be deployed on a large scale as of 2030. What is more, expected changes in consumer behaviour and industrial production in Europe are likely to have an impact on transportation needs. At present, there is a clear lack of data on the impacts of modal shift, both in terms of industrial production, transport use and the employment effects.

Transforming the European transport system so drastically in such a short period of time will have massive impacts on the European workforce. Some sectors of the transport system will experience job losses, while other parts will grow. The twin digital and green transitions will also trigger important changes in terms of qualification requirements. Finally, it will also impact working conditions and the organisation of work in many ways. All those elements require an anticipation from social partners and capacity building for workers' representatives.

In this context, it is staggering that there is little to no attempt made to provide a social dimension to industrial strategies for the transformation or transport policies, beyond voluntary skills initiatives. On the contrary, industrial and transport policies continue to operate in policy silos and neither takes much care of the impacts on jobs or the workers impacted in the different sectors.

1. See the EU Green Deal Communication, available at:

https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF

2. European Environment Agency, *Greenhouse gas emissions from transport in Europe*. Available at:

<https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-transport>

Both manufacturing workers and transport workers have long and proud histories of organising, negotiating and managing change in their industries. Traditionally well-organised sectors, trade unions in these industries have been the backbone of the trade union movement, at national and international levels, since its origins. With distinct occupational identities and workplace cultures, manufacturing and transport workers may share broad common demands but have often had different challenges to tackle on the shopfloor or behind the wheel. More often than not, traditionally, workers in these sectors' main joint arena for action is within trade union confederation structures.

This report, and the project from which it stems, reflects a different approach and is the first joint IndustriAll Europe and European Transport Workers' Federation attempt to address the single biggest challenge facing both sets of workers: how to ensure sustainable mobility and reduce greenhouse gas emissions, while guaranteeing a Just Transition for the workforce?

As trade unions, determined to ensure that our members' voices are heard in the transformation underway, we have engaged in an intensive series of roundtables which have allowed deep-dives into the reality in the maritime/shipbuilding, road haulage/automotive, civil aviation/aerospace and rail/rail equipment sectors. By discussing the ongoing changes underway with those who build and those who use transport vehicles professionally, we have been able to identify where our common ground is and the differences. The process and journey we have been on has been as important as the substantial outcome in this report. It has allowed us to take forward concrete common demands to policymakers in global regulatory bodies (ICAO) and EU institutions.

Fundamentally, our collective work has exposed how a deterioration in working conditions and increased precarious work runs directly against the scale of social-industrial revolution underway – a revolution that demands higher skilled workers and technological and social innovation. A transition which fuels social dumping will never be just.

This journey together so far has shown the importance of working together for good outcomes for our members – and our objective remains to deliver Just Transitions for all mobility workers in Europe.

JUDITH KIRTON-DARLING

Deputy General Secretary
IndustriAll Europe

SABINE TRIER

Deputy General Secretary
European Transport Workers' Federation

EXECUTIVE SUMMARY

Decarbonising the transport system is among the top priorities of the EU. Under the European Green Deal, the EU has committed to reducing the transport industry's carbon emissions by 90% by 2050. The Sustainable and Smart Mobility Strategy³ has put European transport on track for the future, setting milestones for all transport modes to become more sustainable by 2030, 2035 and 2050.

While science tells us that it is imperative to irreversibly shift towards a zero-emission mobility and to focus on a green and digital transition, the transformation of transport in such a short period is going to have massive impacts on the European workforce.

The present report highlights the main outcomes of the EU joint project 'Building a Just Transition towards a Smart and Sustainable Mobility' (JT4Mobility) coordinated by IndustriAll European Trade Union and the European Transport Workers' Federation (ETF). The project addresses for the first time the social consequences of the decarbonisation of transport and pathways towards a Just Transition on employment, skills and working conditions for both manufacturing and transport workers throughout the mobility ecosystem. The ecosystem addressed in this study encompasses:

- ▶ the maritime sector and shipbuilding;
- ▶ the aviation and aerospace sector;
- ▶ the road sector (with a special focus on heavy-duty vehicles);
- ▶ the railway sector.

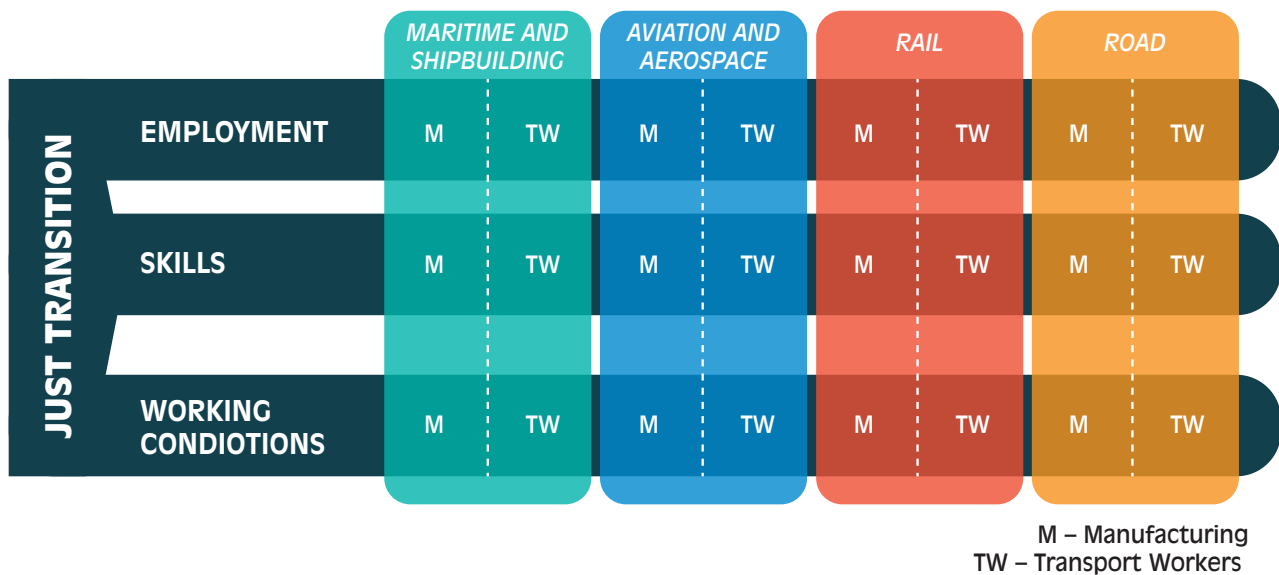


Figure 1: A graphical representation of the JT4Mobility project

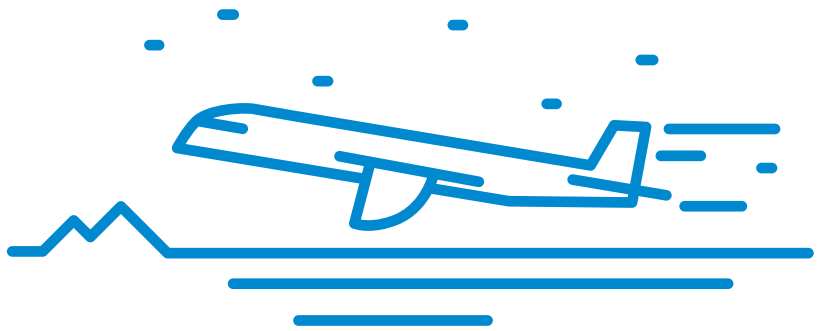
3. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 9 December 2020, *Sustainable and Smart Mobility Strategy – putting European transport on track for the future*. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789>.



The **MARITIME SECTOR** is facing numerous trends common to both manufacturing and maritime workers (maritime transport, dockers, inland navigation and fisheries). Unclear implementation strategies when it comes to delivering EU policy requests on new sustainable fuels, social dumping, the lack of attractiveness of the sector and an ageing workforce, are just some of the main trends the study has underlined. When it comes to skills, there is a striking lack of standardised training and mutual skills recognition mechanisms, while working conditions, health and safety and gender inequalities are the common challenges. Maritime workers do not have a proper work-life balance, conditions on board and infrastructure are precarious. Shipbuilding has high levels of temporary workers and the work is cyclical in nature, and that is not all: there is not only the collapse of the cruise ships segment but also the drain of resources into defence and offshoring.

Among the main open action points envisaged to promote a Just Transition for the maritime sector, underlined in this study, are:

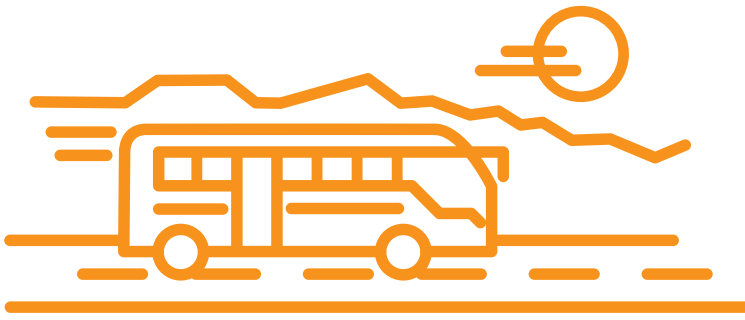
- ▶ Advocating a clear EU policy and strategy on the future of new fuels
- ▶ Establishing effective policies to counter social dumping
- ▶ Promoting a new sectoral image to attract young people
- ▶ Designing training programmes that prepare workers for the digital/green skills required
- ▶ Replacing and/or renovating old infrastructures to ensure the safety of workers
- ▶ Carefully preparing workers to manage new technologies and fuels safely
- ▶ Encouraging the inclusion of women and the possibility of their involvement and the dissemination of information about their career possibilities
- ▶ Constant involvement of unions and workers' representatives in delineating Just Transition plans



The **AVIATION AND AEROSPACE SECTOR** is under severe pressure to reduce its environmental impact, and is one of the means of transport for which great technological advancement is required in order to substantially reduce emissions. In this scenario, Sustainable Aviation Fuels (SAFs) may represent a viable solution in the medium term. But with the volume of air traffic increasing after COVID-19, and at the same time the need for demand restraint solutions to comply with environmental requirements, there are many challenges for workers in what is still a very fluid situation. The current shortage of workers in aerospace manufacturing may make it difficult for the supply chain to keep up with demand. In parallel, job transitions as a result of demand restraint solutions are one of the options, thereby making redeployment, managed in a socially fair way, even more vital. Skills shortages will be seen with the deployment of SAFs, for both aviation and workers in aerospace manufacturing. Working conditions challenges, especially for aviation workers (low wages, long hours, precarious contracts, health and safety risks, work-life balance), can be further amplified by new possible health and safety hazards arising from new technologies.

For aviation and aerospace, the study considers the following main open action points for a Just Transition for every worker:

- ▶ Defining a clear path towards net-zero CO₂ emissions and an increase in the uptake of SAFs
- ▶ Encouraging the prioritisation of quality over quantity in flying
- ▶ Pushing for social conditionality for funds supporting a fair and Just Transition
- ▶ Investing in R&D programmes working on sustainable aviation
- ▶ Planning for future skills and investing in the up/reskilling of the workforce
- ▶ Ensuring a work-life balance in the case of up/reskilling pathways for workers
- ▶ Guaranteeing social protection in the case of inevitable job transitions
- ▶ Prioritising workers' health and safety, especially with the uptake of new fuels
- ▶ Creating quality jobs with decent pay and conditions to better attract and retain workers
- ▶ Ending precarious work and short-term contracts to ensure more worker retention and greater attractiveness



The **ROAD SECTOR** covers various transport modes – cars, light commercial vehicles and heavy-duty vehicles (HDVs), but the study has particularly focused on HDVs (trucks and local and long-distance buses and coaches) as these provide the common ground for action in the context of the joint project. Digitalisation, automation and electrification are the main trends for this sector, together with changes in urban mobility and the push for a modal shift (e.g. road to rail, to urban public transport, to walking and cycling); but also changes in consumption patterns (more online shopping and the resultant increase in demand for accelerated delivery services). There is a workforce shortage, and up/reskilling and skills forecasting mechanisms need to be improved. There is also a need to look at infrastructure that is poor in terms of meeting the demands of e-mobility. For transport workers, the lack of proper facilities, long working shifts, precarious work and social dumping are accompanied by poor recognition of the driver profession. For manufacturing, competition and collaboration with outside Europe, productivity increases and uncertainty regarding volumes are significant points to be addressed.

A Just Transition for the road sector should consider the following open action points:

- ▶ Demanding more consistency at European level and harmonisation of sustainability policies and initiatives, in order to streamline the sector's efforts to manage the transition carefully and to allow anticipation of future needs
- ▶ Evaluating open strategic autonomy and diversification of the supply chain with regard to sustainable energies as well as critical raw materials
- ▶ Encouraging negotiations to agree on plans and strategies to achieve Just Transition at company level
- ▶ Implementing charging and safer infrastructure to meet the demand for e-mobility
- ▶ Paying attention to future job opportunities in R&D
- ▶ Preparing workers through lifelong learning at company level
- ▶ More planning for future skills: identifying the risks that may emerge with the use of new fuels
- ▶ Considering a reduction in working hours, while at the same time preventing all the possible negative impacts on drivers (e.g. more work-related stress in order to meet delivery targets) and ensuring that charging time for zero-emission vehicles is considered part of working time (and that this does not happen during a driver's breaks or when taking rest time in the vehicle)
- ▶ Equipping parking infrastructures with the facilities that bus, coach and truck drivers need
- ▶ Guaranteeing social protection and preserving good working conditions in case of job transitions (as a result of the modal shift)



The **RAILWAY SECTOR** too is facing several common opportunities and challenges brought about by the green and digital transition. Rail is considered a strategic sector to decarbonise transport, but there is currently a mismatch between what is demanded at EU policy level and what can actually be delivered in such a short period – including the renovation of infrastructure and use of new green technologies.

A shortage of workers and skills, together with a severe lack of attractiveness and competition between different sectors to attract talents are key issues. For railway workers in particular, work shifts, working unsocial hours, insecure contracts and poor wages are other important concerns to be addressed. The impact of liberalisation policies is creating several challenges. For manufacturing specifically, key issues include the supply of raw materials, delocalisation and relations outside Europe (which may create further competition for investments between EU sites and locations in third countries).

Among the main open action points envisaged to promote a Just Transition for the railway sector, the study considers:

- ▶ Giving rail the strategic role it deserves in the green transition of transport, by advocating a concrete and implementable policy and strategy
- ▶ Emphasising the need for investments/financing at EU and national levels to renovate infrastructure
- ▶ Delineating the future of implementable alternative fuels and technologies
- ▶ Promoting social dialogue
- ▶ Ensuring a level playing field with other transport sectors
- ▶ Financing up/reskilling of workers towards green and digital, including flexible pathways
- ▶ Encouraging intermodal cooperation to identify how to tackle the issue of last-mile delivery
- ▶ Making the sector attractive for new workers to ensure sufficient levels of staffing and decrease work pressure
- ▶ Establishing rules/standards/practices relating to the Just Transition to ensure decent working conditions for workers and quality jobs that ensure dignity, stable employment and decent protection and wages

There are many commonalities between manufacturing and transport workers at sectoral level. For this reason, the study strongly supports the implementation of a joint strategy, with a view to encompassing the entire mobility ecosystem. The analysis of the potential impacts of the green/digital transition on its workforce can pinpoint the main common opportunities and challenges in order to achieve both environmental and social sustainability objectives, and a Just Transition for everyone.

A. INTRODUCTION AND BACKGROUND

1. Size and relevance of the mobility ecosystem in the EU

Transport is essential for European society⁴, allowing movement of individuals, goods and services and as a fundamental service for people's social and work life. It also constitutes a vital part of the economy, representing more than 9% of EU gross value added⁵. Transport is not only fundamental for those who can benefit from transportation by sea, land, and air, but also vital for the consistent number of workers it employs.

For the purposes of this study, we refer to the concept of the “**mobility ecosystem**”, which takes into account **both the perspective of vehicle manufacturing and transport workers**. In particular, four main sectors are at the centre of this research – which covers **employment, skills and working conditions**:

- ▶ the maritime sector and shipbuilding⁶;
- ▶ the aviation and aerospace sector;
- ▶ the road sector (including automotive/cars, urban public and delivery transport and heavy-duty vehicles);
- ▶ the railway sector.

Each of the above sectors contributes differently to the European GDP, and it is therefore important to understand fully how the workforce is divided between these four areas.

1.1 Maritime

The **maritime sector** has a total of 230,000 maritime transport workers⁷, over 150,000 people working in fisheries, 250,000 dockers and approximately 40,000 in inland navigation; half a million workers are employed in shipbuilding, maritime equipment and the ship maintenance, repair & conversion (SMRC) industry⁸.

THE MARITIME SECTOR No. of EU WORKERS (x1000)

- TRANSPORT
- SHIPBUILDING AND SHIPREPAIRING
- FISHERIES
- DOCKERS
- INLAND WATERWAYS NAVIGATION

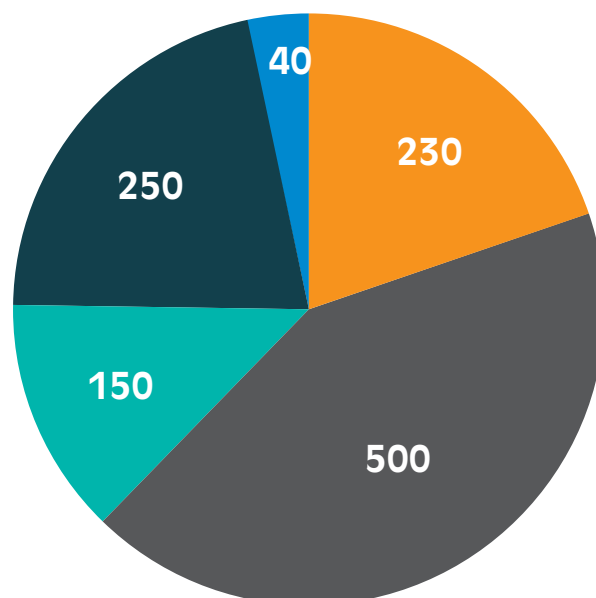


Figure 2: Number of workers in the maritime sector

4. European Commission, *White Paper on Transport*, Publications Office of the European Union, Luxembourg, 2011, p. 4.

5. European Union, *Transport: Safe, sustainable and connected transport*, https://european-union.europa.eu/priorities-and-actions/actions-topic/transport_en, accessed 12 April 2023.

6. Maritime includes different sectors such as maritime transport itself, inland navigation, fisheries and dockers.

7. ETF, *Maritime Transport*, https://www.etf-europe.org/our_work/maritime-transport/, accessed 12 April 2023.

8. IndustriAll Europe, *Shipbuilding & Ship repair*, <https://news.industrial-europe.eu/p/shipbuilding>, accessed 12 April 2023.

9. Ibid.

The table below presents a general (non-exhaustive) list of more operational professions for the maritime sector, covering both shipbuilding and maritime workers:

MARITIME PROFESSIONS ¹⁰	SHIPBUILDING AND REPAIRING PROFESSIONS ¹¹
<p>DECK DEPARTMENT:</p> <ul style="list-style-type: none"> - Chief officer (management level) - Officers in charge (operational level) - Radio officer (operational level) <p>DECK RATINGS (SUPPORT LEVEL):</p> <ul style="list-style-type: none"> - Boatswain - Able seaman - Ordinary seaman <p>ENGINE DEPARTMENT:</p> <ul style="list-style-type: none"> - Chief engineer (management level) - Second engineer (management level) - Engineers in charge (operational level) <p>ENGINE RATINGS (SUPPORT LEVEL):</p> <ul style="list-style-type: none"> - Pump man - Fitter - Oiler - Wiper (also called motorman) <p>CATERING, HOSPITALITY AND ON-BOARD SERVICES RATINGS</p> <p>DOCKERS:</p> <ul style="list-style-type: none"> - Operators - Signallers - Lashers - Tally clerks and chief tally clerks - Chief foremen (supervisors) 	<p>SHIP/VESSEL CONSTRUCTION:</p> <ul style="list-style-type: none"> - Boilermaker - Welder - Pipefitter - Pipe designer - Naval painter - Naval designer - Shipwright - Fitter - Naval maintenance welder <p>MECHANICS/ELECTRICIANS:</p> <ul style="list-style-type: none"> - Naval mechanic - Naval electricians - Naval electronics - Additive manufacturing mechanic - Naval maintenance mechanic - Naval maintenance electrician - Underwater electrician - Offshore technician - Mechatronic technician - IOT technician <p>CYBER/DATA EXPERTS:</p> <ul style="list-style-type: none"> - Cyber-security expert - Big data expert - Cloud computing expert - Virtual reality expert <p>SUPERVISORS/MENTORS:</p> <ul style="list-style-type: none"> - Ship assembly supervisor

Table 1: Jobs in the maritime and shipbuilding sector

The European Union is a major player in the shipbuilding industry, with approximately 300 shipyards specialised in building and repairing civilian and naval ships and platforms¹²; and it has reportedly reached 125 billion euros in total. The turnover at European level for 2019 amounted to €49.0 billion for shipbuilding and €8.9 billion for equipment and machinery¹³. Maritime transport plays a crucial role at international level for the transport of people, services and goods. The turnover of this industry reported for 2019 was €163.4 billion, of which 59% is due to freight transport (€96.6 billion), followed by services at 27% (€43.9 billion) and passenger transport with 14% (€22.9 billion)¹⁴.

10. Communication from ETF members, June 2023.

11. USWE Project, *Shipbuilding and Maritime Technology*. A sector providing a wide range of employment opportunities, 30 November 2020.

Available at: https://www.usweproject.eu/images/Booklet_for_Students_Shipbuilding_and_Maritime_Technology_A_smart_option_for_you_copy.pdf.

12. European Commission Directorate-General for Maritime Affairs and Fisheries, *The EU Blue Economy Report*, Publications Office of the European Union, Luxembourg, 2022, p. 86.

13. *Ibid.*, p. 88.

14. *Ibid.*, pp. 93-95.

15. Eurostat, *Young air transport workers impacted by COVID crisis*, <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220810-1>, 10 August 2022.

1.2 Aviation and Aerospace

Regarding the aviation and aerospace sector, aviation workers employed were about 325,600¹⁵ in the first quarter of 2022, while half a million people are currently employed in the aerospace manufacturing industry¹⁶. The aviation sector also plays a very important role for the economy of the European Union, with a registered total of 130 billion revenues in 2019 in the production of civil aircraft (helicopters, aircraft engines, parts and components)¹⁷, and with a consistent investment in research and development to maintain the global competitiveness of approximately 8 billion euros in 2019. The turnover of air transport, on the other hand, amounted to 65.5 billion euros in 2020, 49% less than 2019 due to the COVID-19 pandemic¹⁸.

THE AVIATION AND AEROSPACE SECTOR No. of EU WORKERS (x1000)

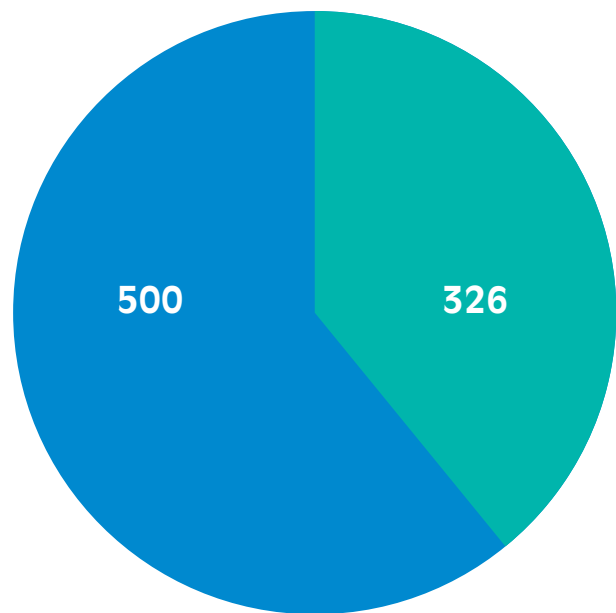
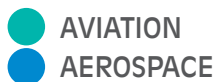


Figure 3: Number of workers in the aviation and aerospace sector

16. IndustriAll Europe, *Aerospace*, <https://news.industriall-europe.eu/p/aerospace>, accessed 12 April 2023.

17. European Commission, *EU Aeronautics Industry*, https://defence-industry-space.ec.europa.eu/eu-aeronautics-industry_en, accessed 13 April 2023.

18. Statista, *Annual turnover of the air transport industry in the European Union (EU-28) from 2011 to 2020*, <https://www.statista.com/statistics/1118444/turnover-air-transport-industry-european-union/>, 3 April 2023.

19. Eurostat, *Young air transport workers impacted by COVID crisis*, <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220810-1>, 10 August 2022; and IndustriAll Europe, *Aerospace*, <https://news.industriall-europe.eu/p/aerospace>, accessed 12 April 2023.

20. Communication from ETF members.

21. GIFAS report, *Métiers de l'industrie aéronautique et spatiale*.

Available at: https://res.cloudinary.com/gifas/image/upload/Documents/LivretM%C3%A9tiers_2023.pdf.

The table below presents a general (non-exhaustive) list of more operational professions, covering both aerospace and aviation professions:

AVIATION PROFESSIONS ²⁰	AEROSPACE PROFESSIONS ²¹
<p>AIR TRAFFIC MANAGEMENT:</p> <ul style="list-style-type: none"> - Air traffic control officer - Meteorological officers - Air traffic safety engineering professionals - Flight data processing - ATC simulation staff - Flight information service officer - Operations staff - Cybersecurity staff - Aeronautical information staff - Safety management - Civil-military coordinators - Route planning <p>AIR CREW:</p> <ul style="list-style-type: none"> - Cabin crew - Pilots - Cabin supervisors - Pilot instructors - Cabin instructors - Examiners and inspectors <p>GROUND STAFF:</p> <ul style="list-style-type: none"> - Check-in staff - Boarding staff - Aircraft cabin cleaning - Airport cleaning - Baggage handlers - Pushback drivers - GSE maintenance - Ramp marshalling - Ramp inspectors - Aerodrome maintenance - Airport authority staff - Airport firefighters, paramedics and police - Airport security staff - Customer service - Aircraft mechanics (MRO) - MRO administration - Aeronautics engineering - Avionics engineering 	<p>RESEARCH AND DEVELOPMENT OFFICE:</p> <ul style="list-style-type: none"> - Electronic design technician - Mechanical design technician - Engineer for software development - Research engineer - Engineer for research & development structure <p>PRODUCTION:</p> <ul style="list-style-type: none"> - Cell assembly fitter - Aeronautical boilermaker - Mechanic assembler for aeronautical equipment - Cable installer - Aeronautical painter - Laminator/drapper - Method technician - Machining technician – 3D manufacturing - Scheduling technician <p>TRIALS INTEGRATION STIMULATION:</p> <ul style="list-style-type: none"> - Test technician – aircraft - Non-destructive testing technician - Satellite or radar integration engineer <p>MAINTENANCE – REPAIR – AFTER-SALES SERVICE:</p> <ul style="list-style-type: none"> - Aircraft mechanic - Avionics mechanic - Revision engine mechanic - Customer service and support technician <p>SUPPORT FUNCTIONS:</p> <ul style="list-style-type: none"> - Logistic technician - Engineer in charge of business - Engineer for quality - Data scientist - Cybersecurity engineer

Table 2: Jobs in the aviation and aerospace sectors

1.3 Road

About 13.8 million people work in the road sector in Europe, with 3.5 million jobs in manufacturing (direct and indirect), 4.5 million employees in sales and maintenance and 5.1 million workers in road transport²²:

THE ROAD SECTOR No. of EU WORKERS

- MANUFACTURING
- SALES and MAINTENANCE
- TRANSPORT

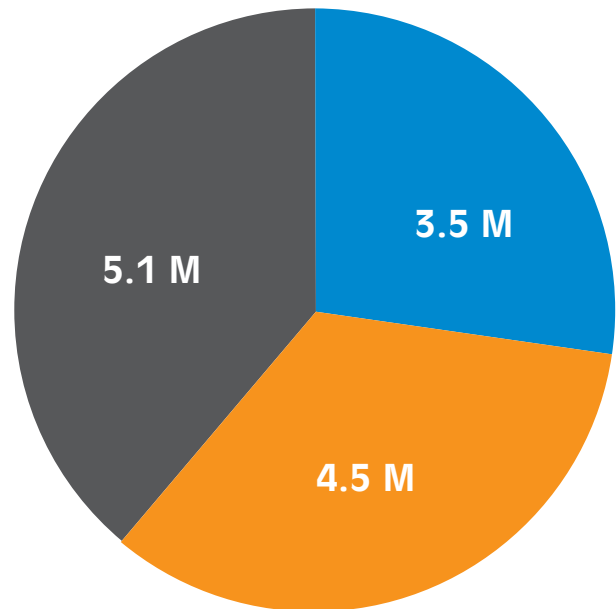


Figure 4: Number of workers in the road sector (M = million)

The sector itself is the backbone of the European economy, covering about 8% of its GDP²⁴. The largest automotive manufacturing industry in Europe is in Germany, with about 2.9 million passenger cars and about 234,000 commercial vehicles produced in 2021²⁵, while the leading countries for the transport and storage sector are Germany, France and Italy, with respective revenues of 314.4 billion, 195.5 billion and 157.1 billion euros²⁶. Between 2010 and 2019, passenger cars' share in the EU ranged from 82.0% to 83.1%. This share increased to 87.2% in 2020, reflecting the impact of the COVID-19 crisis. The share for coaches, buses and trolleybuses ranged from 9.5% to 10.4% between 2010 and 2019. When it comes to freight transport, it reached 77.4% in 2020²⁷.

The table below presents a general (non-exhaustive) list of more operational professions for the automotive industry, covering both road manufacturing and road transport workers:

ROAD TRANSPORT PROFESSIONS ²⁸	MANUFACTURING PROFESSIONS ²⁹
<p>PASSENGER TRANSPORT:</p> <ul style="list-style-type: none"> - Bus/coach/tram driver - Taxi driver <p>FREIGHT TRANSPORT:</p> <ul style="list-style-type: none"> - Cargo and freight agents - Truck driver - Van driver - Driver/sales worker - Heavy and tractor-trailer truck driver - Material moving machine operator 	<p>RESEARCH AND DEVELOPMENT:</p> <ul style="list-style-type: none"> - Mechanical engineer - Powertrain engineer - Chassis design engineer - Dimensional engineer - Vehicle dynamics engineer - Component engineer - Automotive designer <p>PRODUCTION AND MAINTENANCE:</p> <ul style="list-style-type: none"> - Machine operator - Parts assembler - Vehicle technician - Electrician - Maintenance technician - Mechanics and repairers <p>SUPPORT:</p> <ul style="list-style-type: none"> - Test driver - Quality and Safety Engineer - Vehicle maintenance supervisor

Table 3: Jobs in the road sector

22. European Commission, *Automotive industry*, https://single-market-economy.ec.europa.eu/sectors/automotive-industry_en, accessed 12 April 2023.

23. Ibid.

24. ACEA, *Energy crisis: Impact on competitiveness of EU auto sector*, <https://www.acea.auto/news/energy-crisis-impact-on-competitiveness-of-eu-auto-sector/>, 21 October 2022.

25. Statista, *Motor vehicle production volume in Europe in 2021, by country and vehicle type*, <https://www.statista.com/statistics/585024/leading-car-automotive-manufacturer-europe-by-country/> 11 March 2023.

26. Statista, *Turnover in the transport and storage sector in Europe in 2020, by country*, <https://www.statista.com/statistics/449066/europe-28-turnover-volume-in-the-transport-sector-by-country/>, 13 April

27. Eurostat, *Key figures on European transport*, 2022 edition, <https://ec.europa.eu/eurostat/documents/15216629/15589759/KS-07-22-523-EN-N.pdf>. 28 ESCO, <https://esco.ec.europa.eu/>.

29. Ibid.

1.4 Rail

For the railway sector, there are about 400,000 employees in the rail supply industry. When it comes to transport, over 916,000 people were employed in the railway sector in 2018. About 527,000 of the latter were employed by railway undertakings, while 389,000 were employed by infrastructure managers. The turnover for the railway manufacturing industry was about €49.2 billion in 2017, and for the transport sector, the turnover calculated for 2019 was €74.584 billion.

THE RAILWAY SECTOR No. of EU WORKERS (x1000)

- TRANSPORT (railway undertaking)
- MANUFACTURING
- TRANSPORT (infrastructure managers)

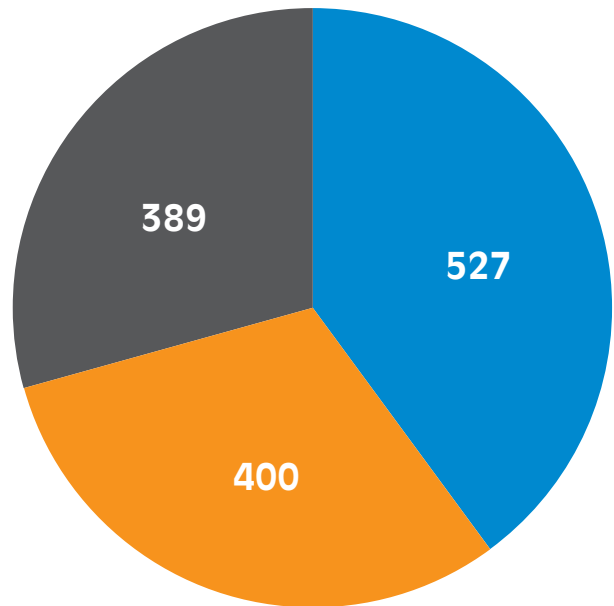


Figure 5: Division of labour in the railway sector³⁰

The table below presents a general (non-exhaustive) list of more operational professions, covering both railway workers and rail manufacturing:

RAIL PROFESSIONS ³¹	RAIL MANUFACTURING PROFESSIONS ³²
<p>STATION:</p> <ul style="list-style-type: none"> - Station master - Service workers - Ticket sellers - Cleaners <p>ON-BOARD:</p> <ul style="list-style-type: none"> - On-board staff - Train driver - Shunter - Security staff <p>CLEANERS:</p> <ul style="list-style-type: none"> - Operational - Signaller - Train dispatcher/rail traffic controller - IT - Planner - Customer service <p>MAINTENANCE:</p> <ul style="list-style-type: none"> - Rolling stock maintenance - Infrastructure maintenance 	<p>ENGINEERING:</p> <ul style="list-style-type: none"> - Mechanical engineer - Logistics engineer - Electrical engineer - Rolling stock engineer - ICT engineer - Rail logistics coordinator - Railway project engineer

Table 4: Jobs in the railway sector

30. Report from the Commission to the European Parliament and the Council of 13 January 2021, *Seventh Monitoring Report on the development of the rail market under Article 15(4) of Directive 2012/34/EU of the European Parliament and of the Council*, COM(2021) 5 final, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0005>; and European Commission, *Rail supply industry*, https://single-market-economy.ec.europa.eu/sectors/mechanical-engineering/rail-supply-industry_en, accessed 12 April 2023.

31. ESCO, <https://esco.ec.europa.eu/>; and STAFFER project, *Identification of skill needs and occupational profiles from the rail operators and infrastructure managers point of view*, <https://www.railstaffer.eu/wp-content/uploads/2022/09/STAFFER-D-2.2-Report-consolidated-2022-05-30.pdf>.

32. Ibid.

2. Main EU-level policy initiatives for sustainable mobility

As the previous numbers demonstrate, the above four sectors are key resources for the European economy, as well as a form of livelihood for more than 14 million people in the old continent alone³³. The increasing attention to climate change and its environmental, social and economic challenges have put the transport system in the crosshairs of the EU, committed to setting objectives to achieve carbon neutrality. This will of course require the mobility ecosystem to drastically innovate, implying massive changes in employment for both manufacturing and transport workers³⁴.

2.1 Achieving climate neutrality

The European plan to develop a greener transport sector was officially concretised at the end of 2019 with the elaboration of the Green Deal³⁵, a plan studded with very ambitious goals and aimed at achieving climate neutrality by 2050. This very first step towards climate neutrality was later made even more concrete with the establishment of the Fit for 55 Plan³⁶, which showed the commitment of the EU to actually reaching the objectives designed in the Green Deal's text, by labelling in the time span of one year about a dozen proposals for legislative measures to reach climate goals³⁷.

The Sustainable and Smart Mobility Strategy³⁸ lays the foundations for how the EU transport system can become more sustainable, smarter and more resilient in the next future. By setting specific goals by 2030, 2035 and 2050, the Strategy identifies some key actions, such as:

- ▶ Enhancing the uptake of zero-emission vehicles, airplanes and vessels, renewable & low-carbon fuels and related infrastructure
- ▶ Creating zero-emission airports and ports
- ▶ Doubling high-speed rail traffic to make urban and inter-urban mobility more sustainable, as well as greening freight transport by doubling rail freight traffic by 2050
- ▶ Working on an automated multimodal mobility and boosting innovation
- ▶ Investing in the Trans-European Transport Network (TEN-T) by 2030
- ▶ Making mobility more accessible, affordable and attractive for young workers

To present some of the goals in numbers, the objectives for 2030 are to have at least 30 million zero-emission vehicles operational on European roads; 100 European cities climate neutral; a doubled high-speed rail traffic; automated mobility on a large scale; and zero-emission vessels ready for market (zero-emission large aircraft by 2035). The goals for 2050 are to have nearly all cars, vans, buses, as well as new heavy-duty vehicles, zero-emission; a doubling of rail freight traffic; and the multimodal TEN-T fully operational.

Another European step taken to reach climate neutrality is the European **Energy Taxation Directive**, a framework for the taxation of energy products including electricity, motor and most heating fuels, which has been revised in the context of the Fit for 55 package in 2021³⁹. The ETD was revised with the aim of ensuring a better level playing field between Member States, as over the years, a rather complex set of reductions and

33. European Commission, Staff Working Document of 24 January 2022, *For a resilient, innovative, sustainable and digital mobility ecosystem – scenarios for a transition pathway*. Available at: <https://ec.europa.eu/docsroom/documents/48535>.

34. These chapters aim to give a general overview of the main employment trends for the "mobility ecosystem". For a more in-depth analysis, please refer to the relevant sectoral chapters.

35. Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF.

36. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0550&qid=1683544880028>.

37. Akgüç M., Arabadjieva K., Galgóczi B., *Why the EU's patchy 'just transition' framework is not up to meeting its climate ambitions (ETUI Policy Brief)*, June 2022, p. 2. Available at: <https://www.etui.org/sites/default/files/2022-04/Why%20the%20EU%E2%80%99s%20patchy%20%E2%80%98just%20transition%E2%80%99%20framework%20is%20not%20up%20to%20meeting%20its%20climate%20ambitions-2022.pdf>.

38. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions of 9 December 2020, *Sustainable and Smart mobility Strategy – putting European transport on track for the future*, COM(2020) 789 final, p. 8. Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:5e601657-3b06-11eb-b27b-01aa75ed71a1.0001.02/DOC_1&format=PDF.

39. European Commission, *Revision of the Energy Taxation Directive*, https://taxation-customs.ec.europa.eu/green-taxation-0/revision-energy-taxation-directive_en, accessed 20 June 2023.

40. European Commission, *Revision of the Energy Taxation Directive (ETD): Questions and Answers*, https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3662, 14 July 2021.

exemptions had proliferated⁴⁰. The main changes of the revised Directive include taxing fuels according to their energy content and environmental performance rather than their volume⁴¹. This has consequences for example on the costs of diesel –as it will increase greatly, and on kerosene for aviation, as it will no longer be exempt from energy taxation for intra-EU voyages. The tax for aviation fuels will be introduced gradually in the industry, before reaching the final minimum rate after a transitional period of ten years⁴².

The latest revision of the Emission Trading System (ETS), the European cap-and-trade system to reduce greenhouse gas emissions for industries in the European Union⁴³, is another key step. In the context of the European Fit for 55 Package, the ETS was revised as follows⁴⁴:

- ▶ GHG emissions of ETS sectors must be cut by 62% by 2030 compared to 2005
- ▶ Free allowances will be phased out from 2026 to 2034

Some new features of this revision were the inclusion of GHG emissions of the maritime sector⁴⁵, as well as the approval of the expected phasing out of free allowances for aviation by 2026⁴⁶. Another key step is related to the establishment of an autonomous emissions trading system for fuel distribution for road transport and buildings (the ETS II): this provision will put a price on GHG emissions from these sectors in 2027 (or 2028, if energy prices are exceptionally high).

2.2 Cleaner fuels

When it comes to the use of cleaner fuels, reference should also be made to ReFuelEU Aviation, part of the Fit for 55 Package. Proposed in July 2021 and revised in April 2023, the primary objective of the measure is to reduce emissions from the sector by increasing the share of Sustainable Aviation Fuels (SAFs)⁴⁷: all fuel uplifted by aircraft operators at EU airports should contain a minimum share of 2% of SAFs by 2025, which should increase every five years to reach 70% by 2050⁴⁸. The same can be said for maritime, and the FuelEU Maritime initiative⁴⁹: also proposed in 2021. Its primary objective is to increase the demand for and consistent use of renewable and low-carbon fuels⁵⁰.

In this context, different and less polluting energies were (and still are) progressively being evaluated for the future of transport, as well as the necessity to diversify the European supply chain. The energy that has been receiving growing attention at a European policy level to reach the decarbonisation objectives is hydrogen. Despite the European Commission's good premise in its 2020 Hydrogen Strategy, which calls for a) cumulative investments in renewable hydrogen of up to 180–470 billion euros by 2050, b) a dramatic reduction in greenhouse gas emissions of 50 or 55% by 2030, and c) increased job opportunities⁵¹, many doubts have been raised about the real possibility of implementing hydrogen as an alternative energy; an example is the fact that only 1% of global hydrogen production is fuel-efficient, the rest being produced with fossil fuel-based technologies⁵².

41. European Commission, *Revision of the Energy Taxation Directive*, https://taxation-customs.ec.europa.eu/green-taxation-0/revision-energy-taxation-directive_en, accessed 20 June 2023.

42. European Commission, *Revision of the Energy Taxation Directive (ETD): Questions and Answers*, https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3662, 14 July 2021

43. Climate Policy Info Hub, *The EU Emission Trading System: an Introduction*, <https://climatepolicyinfohub.eu/eu-emissions-trading-system-introduction.html>, accessed 20 June 2023.

44. European Parliament, *Fit for 55: Parliament adopts key laws to reach 2030 climate target*, <https://www.europarl.europa.eu/news/en/press-room/20230414IPR80120/fit-for-55-parliament-adopts-key-laws-to-reach-2030-climate-target>, 18 April 2023.

45. Ibid.

46. Ibid.

47. European Parliament, *Fit for 55: deal on more ambitious emissions reduction for aviation*, <https://www.europarl.europa.eu/news/en/press-room/20221205IPR60611/fit-for-55-deal-on-more-ambitious-emissions-reduction-for-aviation>, 7 December 2022.

48. European Council, *Council and Parliament agree to decarbonise the aviation sector*, <https://www.consilium.europa.eu/en/press/press-releases/2023/04/25/council-gives-final-green-light-to-legislation-that-will-make-products-safer-for-consumers/>, 25 April 2023; and Dubois L., *EU agrees rules to boost use of sustainable fuels in aviation*, <https://www.ft.com/content/d04d49ce-a311-4542-9b8c-92b81e53292a>, 26 April 2023.

49. ECSA (European Committee of Shipowners Association), ICS (International Chamber of Shipping), *FuelEU Maritime: Avoiding unintended consequences*, 2021, p. 4. Available at: <https://www.ics-shipping.org/wp-content/uploads/2021/05/FuelEU-Maritime-Avoiding-Unintended-Consequences-1.pdf>.

50. For more details on ReFuelEU Aviation and FuelEU Maritime, please see the relevant sectoral chapters.

51. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 8 July 2020, *A hydrogen strategy for a climate-neutral Europe*. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0301>.

52. IEA, *Hydrogen*, <https://www.iea.org/energy-system/low-emission-fuels/hydrogen>, September 2022.

2.3 Raw materials and EU production capacity

In 2023, the focus has been primarily given to the importance of raw materials, which have gained the attention of European policymakers in recent years, resulting in the Critical Raw Materials Act, of which the main objective is to achieve greater European independence from imports of critical raw materials (such as arsenic, manganese, helium, copper, nickel, etc.⁵³) and to diversify their supply chain towards sustainability and circularity, the European Union itself being heavily dependent on third countries for the hoarding of these natural resources. This new path towards major European independence requires Member States to take some measures that will also improve circularity⁵⁴, including efforts to mitigate any adverse impacts with respect to labour rights. The 2030 benchmarks laid down by the Critical Raw Materials Act are as follows:

- ▶ At least 10% of the EU's annual consumption to be used for extraction
- ▶ At least 40% of the EU's annual consumption to be used for processing
- ▶ At least 15% of the EU's annual consumption to be used for recycling
- ▶ No more than 65% of the EU's annual consumption of each strategic raw material at any relevant stage of processing to be imported from a given third country

Lastly, the European Commission's recent 2023 **Net-Zero Industry Act** delineates the EU's willingness to focus its investments on production capacity of products that are essential to meet Europe's climate goals⁵⁵ (such as solar photovoltaic and solar thermal technologies and battery/storage technologies) and again reducing the EU's dependence on non-EU fossil fuels. The fundamental goal is to increase the production capacity of zero-emission technologies to meet 40% of the annual needs of the European Union by 2030.

In May 2022, the Commission and the European Parliament designed the **REPowerEU plan**⁵⁶ after the beginning of the Russian-Ukrainian war, to reduce European dependencies on Russian fossil fuels. The document gives different possible recommendations to reach these objectives, such as promoting energy savings, diversifying energy imports and using smart investments (REPowerEU provides an investment of about 210 billion euros between now and 2027).

2.4 EU infrastructure policies

With regard to transport infrastructure policies, the **Regulation for the deployment of alternative fuels infrastructure (AFIR)** sets mandatory deployment targets for electric recharging and hydrogen refuelling infrastructure for the road sector, for shore-side electricity supply in maritime and inland waterway ports, and for electricity supply to stationary aircraft⁵⁷. In May 2023, rail was also finally included in the Regulation⁵⁸, providing for Member States having the responsibility of assessing the development of alternative fuel technologies and propulsion systems for rail sections that cannot be electrified, and by 2025, these countries having to give an overview of the state of play, perspective and planned initiatives for hydrogen or battery electric trains on parts of the network that cannot be electrified.

The **Trans-European Transport Network (TEN-T)** aims to create an EU wide network of railways, inland waterways, short sea shipping routes and roads linking urban nodes, maritime and inland ports, airports and terminals. The Regulation was recently revised in the context of the EU Green Deal to address the need to

53. European Commission, *Critical Raw Materials*, https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials_en, accessed 8 May 2023.

54. European Commission, *Critical Raw Materials Act*, March 2023. Available at: <https://www.certifico.com/component/attachments/download/34659>.

55. European Commission, *The Net-Zero Industry Act: accelerating the transition to climate neutrality*, https://single-market-economy.ec.europa.eu/industry/sustainability/net-zero-industry-act_en, accessed 2 May 2023.

56. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions of 18 May 2022, REPowerEU Plan, SWD(2022) 230 final. Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:fc930f14-d7ae-11ec-a95f-01aa75ed71a1.0001.02/DOC_1&format=PDF.

57. European Commission, European Green Deal: ambitious new law agreed to deploy sufficient alternative fuels infrastructure, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1867.

58. UNIFE, *Press Release: UNIFE and CER welcome the conclusion of the negotiations on the Alternative Fuels Infrastructure Regulation*, <https://www.unife.org/news/press-release-unife-and-cer-welcome-the-conclusion-of-the-negotiations-on-the-alternative-fuels-infrastructure-regulation/>, 24 May 2023.

improve connectivity across Europe, while shifting to more sustainable modes of transport and focusing on urban sustainable mobility⁵⁹. Examples of new goals include:

- ▶ Having TEN-T passenger rail lines allowing trains to travel at 160 km/h or faster
- ▶ A network for lorries to be transported by trains
- ▶ Parking areas equipped with alternative fuels infrastructure
- ▶ Connection of large airports to rail
- ▶ An increased number of multimodal transshipment hubs for freight, and multimodal stations for passengers
- ▶ Sustainable urban action plans to be adopted by cities

2.5 Social dimension of sustainability

The **social dimension** considered in this framework also needs to be analysed, as it has been developed in parallel with respect to environmental requirements.

A **Just Transition Mechanism** was set up to “make sure that no one is left behind”⁶⁰. It provides a specific fund to ensure that workers' wellbeing is respected during this time: the fund is worth 19.2 billion euros in current prices, and it is expected to mobilise about 25.4 billion euros in investments⁶¹. Always in the context of the Just Transition Mechanism, the Council released a specific recommendation in June 2022, reinforcing the objective of ensuring a fair transition towards climate neutrality⁶². The recommendation lists specific instructions to ensure that the transition will be as positive and as fair as possible, among which, a number stand out⁶³:

- ▶ Access to quality learning and training to ensure that the workforce is prepared
- ▶ Implementing apprenticeships and paid traineeships for young talents
- ▶ Continuing innovation and research in the context of decarbonisation
- ▶ Active support for job seekers in the employment process, as well as for workers already present in the sectors affected by the green transition, giving space to women, people with disabilities, older people and low-skilled people in general.

On 16 May 2023, a **Social Climate Fund** was established following the introduction of an ETS II for buildings and road transport. As the rising fuel prices will strongly impact certain sectors, including transport, this Fund is expected to raise 65 billion euros from the auctions of the revised European ETS, taking place from 2026 to 2032⁶⁴. In this context, EU Member States can use the Fund for improved access to zero and low-emission mobility and transport, including subsidies for electrification and investments in urban public transport.

Having considered the main transport frameworks at EU level, the social and behavioural changes/opportunities/challenges that this ambitious agenda is going to bring are the topic of the next sections. In fact, while touching on the social dimension of sustainability, the initiatives developed at EU level to support a fair transition (e.g. Just Transition Mechanism) do not entirely address the demand for a Just Transition Framework for the mobility ecosystem. More granular mapping of employment impacts, policy support and exchange of best practices, transition planning and social dialogue, and adequate pooling of resources is needed⁶⁵. For a more in-depth analysis at sectoral level (maritime, aviation, railway and road), we would call your attention to the sectoral specific chapters.

59. European Commission, *TEN-T Revision*, https://transport.ec.europa.eu/transport-themes/infrastructure-and-investment/trans-european-transport-network-ten-t/ten-t-revision_en#:~:text=Commission%20proposal&text=To%20address%20the%20missing%20links,number%20of%20days%20per%20year, accessed 17 July 2023.

60. European Commission, *The Just Transition Mechanism: making sure no one is left behind*, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism_en, accessed 6 July 2023.

61. Ibid.

62. Recommendation of the Council of the European Union of 16 June 2022 *on ensuring a fair transition towards climate neutrality*, (2022/C 243/04), p. 2. Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022H0627\(04\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022H0627(04)&from=EN).

63. Ibid., pp. 4-7.

64. Proposal for a Regulation of the European Parliament and of the Council of 14 July 2021 establishing a Social Climate Fund, COM(2021) 568 final, p. 2. Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:9e77b047-e4f0-11eb-afa5-01aa75ed71a1.0001.02/DOC_3&format=PDF.

65. CLEPA, IndustriAll Europe [et al.], *Delivering the Just Transition: the social gap in the Fit for 55 Package for automotive workers and workers in the wider mobility ecosystem*. Available at: https://news.industriall-europe.eu/documents/upload/2021/12/637740394623969551JT%20coalition%20briefing_EN_30.11.21.pdf, December 2021.

3. Decarbonising transport: employment trends for 2030-2050

The above commitments towards a decarbonisation of the mobility ecosystem set numerous targets and goals to be achieved with urgent action.

Reaching climate neutrality for **road** transport means following the electrification pathway and exploring energy sources considered more environmentally sustainable. However, the EU framework also touches on some significant changes in urban mobility through sustainable urban action plans: new mobility services, promotion of innovation, improved active mobility infrastructure, and better accessibility and affordability for all to public passenger transports. In addition, passenger transport, logistics and delivery services are going to change radically in the decades to come. In this context, rail is asked to have a key role in the decarbonisation pathway, being responsible for only 0.4% of transport related greenhouse gas emissions⁶⁶. Initiatives to boost the railway sector are proliferating, but the sector might not be sufficiently equipped and prepared to be able to keep up with the demand for a rapid shift to rail. And the progressive strategic role of rail should also be taken into account when it comes to the challenges for intermodal cooperation road/rail (e.g. role of heavy-duty vehicles for freight transport).

The **aviation** sector is experiencing intense pressure to decarbonise and to switch to green solutions such as Sustainable Aviation Fuels⁶⁷. However, air passenger demand is now increasing rapidly after the dramatic drop during the COVID-19 pandemic, thus raising the question if possible demand restraints solutions can co-exist with such an increase⁶⁸. The **maritime** sector also needs to explore new alternative fuels⁶⁹: but what the future will be in terms of fair competition, the future of fuels and related safety of workers is not entirely clear at present.

Decarbonising transport is imperative. But at the same time, it is of the utmost importance to become fully aware of what the social implications are for each sector, in order to possibly prevent, assess or mitigate negative impacts for the workforce employed. Such impacts can represent an additional challenge to the current social issues the workforce in each sector is experiencing⁷⁰, and refer in particular to **new working conditions**, the **need for reskilling and upskilling of workers**, and the **future of employment** when it comes to new jobs or even possible job losses. Although no precise estimates are available at this time⁷¹ on job losses and up/reskilling needs, rough, future projections concerning specific sectors are already available.

About 11 million future job losses are expected to occur as a result of the implementation of the European climate goals⁷² for the automotive and the energy intensive industries in general. In the **automotive industry specifically**, up to half a million individuals are expected to lose their jobs by 2030⁷³, and about 100,000 jobs will be at risk during the shift to electric vehicles by 2025⁷⁴. The automotive sector's future changes towards a greener sector will allegedly require the retraining of 2.4 million workers⁷⁵.

66. Global Railway Review, *The key role of alternative fuels in the decarbonisation of Europe's rail sector*, <https://www.globalrailwayreview.com/article/132700/alternative-fuels-decarbonisation-europe-rail-sector/>, 5 April 2022

67. Airbus, *Hybrid and electric flight: Laying the groundwork for decarbonising aviation*, <https://www.airbus.com/en/innovation/low-carbon-aviation/hybrid-and-electric-flight>, accessed 28 April 2023.

68. ICAO, *ICAO forecasts complete and sustainable recovery and growth of air passenger demand in 2023*. Available at: <https://www.icao.int/Newsroom/Pages/ICAO-forecasts-complete-and-sustainable-recovery-and-growth-of-air-passenger-demand-in-2023.aspx>.

69. European Commission, *Reducing emissions from aviation*, https://climate.ec.europa.eu/eu-action/transport-emissions/reducing-emissions-aviation_en, accessed 28 April 2023; European Commission, *Reducing emissions from the shipping sector*, https://climate.ec.europa.eu/eu-action/transport-emissions/reducing-emissions-shipping-sector_en, accessed 28 April 2023.

70. Please refer to the sectoral chapters for a complete overview of the state of the art in each sector.

71. CLEPA, IndustriAll Europe [et al.], *Delivering the Just Transition: the social gap in the Fit for 55 package for automotive workers and workers in the wider mobility eco-system*, December 2021, p. 2. Available at: https://news.industriall-europe.eu/documents/upload/2021/12/637740394623969551_JT%20coalition%20briefing_EN_30.11.21.pdf.

72. Simon F., *Eleven million jobs at risk from EU Green Deal, trade unions warn*, <https://www.euractiv.com/section/energy-environment/news/eleven-million-jobs-at-risk-from-eu-green-deal-trade-unions-warn/>, 9 March 2020.

73. Akgüç M., Arabadjiyeva K., Galgóczi B., *Why the EU's patchy 'just transition' framework is not up to meeting its climate ambitions*, p. 3. Available at: <https://www.etui.org/sites/default/files/2022-04/Why%20the%20EU%E2%80%99s%20patchy%20%E2%80%98just%20transition%E2%80%99%20framework%20is%20not%20up%20to%20meeting%20its%20climate%20ambitions-2022.pdf>

74. Tamma P., *Will the Green Deal be a job drain?*, <https://www.politico.eu/article/green-deal-job-drain/>, 16 March 2022.

75. CLEPA, IndustriAll Europe [et al.], *Delivering the Just Transition: the social gap in the Fit for 55 package for automotive workers and workers in the wider mobility eco-system*, December 2021.

In March 2022, the International Transport Workers' Federation (ITF) gathered data on some trends relating to future job losses that could occur in the future⁷⁶. Taking bus electrification as an example, the report questions the real veracity of the narrative that it can actually create more jobs. Indeed, although electrification can lead to new jobs in the value chain, electric buses have on average 80% fewer parts than conventional internal combustion buses, leading to less mechanical maintenance and less maintenance staff. Also, there have been worldwide (outside EU) cases in which the new jobs created in this field were assigned to new workers, thus leading to the dismissal of old workers. Health and safety standards are also major concerns for the road sector, where the progressive electrification and use of batteries is going to present safety risks for both manufacturing and road transport workers, thus requiring proper training of the workforce⁷⁸.

The **railway sector** is also going to experience changes, not only for job losses but also new possible positions: more specifically, administrative staff are expected to decrease by 23.3% by 2030 (from 322,000 in 2010 to 290,000 in 2030), while the number of mobile and technical staff is expected to grow⁷⁹. As anticipated, the sector will be a key player in the digital and green transformation, but it will also need to make the shift towards alternative fuels along with electrification: this will require new positions and employees with an adequate up/reskilling process. Back in 2020, Deutsche Bahn, Germany's national railway company, predicted recruitment of around 100,000 new employees in the years ahead⁸⁰. Train drivers, maintenance workers, IT experts and engineers are in high demand.

The **aviation sector** is currently facing a complex and uncertain scenario, where an increase in demand co-exists with the challenge of greening, which remains the same. Such (often contradictory) and complex trends do not allow for a clear picture of the future of employment. The full impact of the decarbonisation of the aviation sector for workers is still unknown. However, careful preparation shall be ensured to face possible job transitions as a result of modal shift to less polluting sectors (such as rail for short-haul flights): this shift will of course have different consequences, such as the need to create feasible up/reskilling pathways, guarantee the same working conditions standards, and last, but not least, always safeguard the choices of workers.

Lastly, in the **maritime sector**, for the manufacturing side, by 2030, the industry will need to revise specific sectoral roles to include Industry 4.0, digital, green and soft competences (such as for welders, shipyard mechanics, naval painters, electricians, etc.) and the demand will increase for professionals in technologies (such as data scientists, 3D printing technicians, system architects, or cybersecurity experts)⁸¹. As regards seafarers, according to the EU SkillSea Project⁸² the skills required can be divided into various groups, including the following:

- ▶ Skills in on-board technologies, which are being incorporated into modern ships (many of which have extensive built-in AI support).
- ▶ Digital skills, which can be divided into two broad groups: skills required to use dedicated software and skills connected with general information management. The first will be required only for seafarers specialised in the maintenance of complex systems and similar high-tech jobs. The second will be required by a much larger group of seafarers, practically for all seafarers executing functions at operational and management levels and those working ashore.
- ▶ Green skills, which at the moment are not easily identifiable, as they are still very much dependent on the future fuels and on adopted technology.

76. ITF Report, *A Just Transition for Urban Transport Workers*, March 2022, p. 23.

Available at: https://www.itfglobal.org/sites/default/files/2022-03/A_Just_Transition_for_Urban_Transport_Workers_Report.pdf.

77. An example is the one that occurred in the USA, where it was found that only 15% of mechanics had been trained to maintain electric buses (ITF Report, p. 23).

78. IndustriAll presentation, Road Workshop, 1 February 2023.

79. ETF, CER (the Voice of European Railways) [et al.], *Employability in the Rail Sector in Light of Digitalisation and Automation (EDA rail)*, report of August 2022, p. 19. Available at: <https://www.etf-europe.org/wp-content/uploads/2022/09/Employability-in-the-Rail-Sector-in-Light-of-Digitalisation-and-Automation-EN.pdf>.

80. RailTech, *Deutsche Bahn hires 25,000 new employees*, <https://www.railtech.com/policy/2020/02/13/deutsche-bahn-hires-25000-new-staff/>, 13 February 2020.

81. IndustriAll Europe, SEA Europe [et al.], *The Shipbuilding Pact for Skills: Upskilling shipbuilding and maritime technology workers in Europe. Summary of the EU Social Partners' Proposal*, March 2021. Available at: https://www.seaeurope.eu/images/content/INFO_PACT_FOR_SKILLS_Shipbuilding_and_Maritime_Tech_Summary.pdf.

82. SkillSea, *Current Skill Needs*, 28 June 2023. Available at: https://www.skillsea.eu/images/Public_deliverables/D11.2-Current-skills-needs-final_28-06-2023.pdf.

The topic of gender equality will also need special attention at European (and international) level, as the transport sector is male dominated and equal opportunities yet to be realised. Taking as an example the maritime sector, women are often subject to strong stereotypes that prevent them from starting a career in this field⁸³.

The pathway towards sustainable mobility will require forward-looking and careful action plans in order to also have a proper “Just Transition” for the road, railway, maritime, aviation and aerospace sectors. The present study seeks to **shed light on potential future scenarios and to pinpoint common opportunities and challenges for both manufacturing and transport workers**, with a view to getting all stakeholders involved in the design and implementation of a fair transition for the mobility ecosystem.

4. Project objectives and methodology

The JT4Mobility project brings together vehicle manufacturing and transport workers in order to pinpoint the main trends that will develop due to the decarbonisation process in the four different transport sectors.

The project’s main objective is to address the consequences of the twin transition by guiding the trends explained above in a way that is as fair as possible to every worker involved; more specifically, the term “Just Transition” refers to the need to leave no worker behind, and to carefully consider the different consequences that could possibly develop during the process of greening and digitalising the transport sectors.

The project aims to meet different demands, including proper social dialogue, workers’ involvement, a guarantee of priority with regard to health and safety conditions in the workplace, an adequate salary, and finally the concrete possibility to attract workers to the transport labour market, regardless of their gender, ethnicity and social status⁸⁴. In order to achieve the above-mentioned objectives, the project relies on a structured approach consisting of mutually reinforcing methodologies conducted in tandem and following both a top-down and a bottom-up approach:

- ▶ Extensive desk research based on the review of the most recent literature, including EU reports, articles and papers on the evolution of the transport system at EU level
- ▶ Interviews with trade union representatives from road, maritime, rail, aviation and aerospace sectors
- ▶ Online and onsite workshops held from January to June 2023 at sectoral level, attended by a wide variety of stakeholders within the mobility ecosystem at EU level. During the workshops, participants were invited to share their views on the current findings. This process has helped with the validation and reality-checking, as well as with the collection of new insights, individual experiences, sector initiatives and possible successful best practices.

83. ETF, *Maritime Transport Section. JT4 Mobility – Online Maritime Workshop*, 31 January 2023.

84. IndustriAll Europe, *Nothing About Us Without Us. A Just Transition Manifesto*, https://news.industriall-europe.eu/documents/upload/2022/5/637878839624413859_T%20manifesto%20short%20EN.pdf.



Shipyard visit, Santurtzi (Spain), 16 June 2023

B. THE MARITIME SECTOR

1. The maritime sector in the framework of the EU decarbonisation strategy

Decarbonising the maritime sector is a must in order to contribute to the EU's increased and necessary climate ambition. The maritime sector is an essential part of the European mobility ecosystem: while not considered as the most polluting one, the collective awareness of the greenhouse gas emissions from its operations has risen in recent years, emissions representing 3-4% of the EU's total CO₂ emissions, or over 144 million tonnes of CO₂ in 2019⁸⁵. For the purpose of this study, we refer to the maritime sector covering both shipbuilding and maritime workers, the latter including maritime transport, dockers, fisheries and inland navigation.

Maritime has specific challenges that must be tackled in order to achieve the European decarbonisation goals. Several measures are the forefront of the EU strategy, aimed at substantially reducing such emissions in line with the objectives of the European Green Deal and the Fit for 55 package⁸⁶. Given this context, assessing the social consequences of the decarbonisation of the maritime sector and its implications for the entire workforce is even more urgent. The industries support and create millions of European jobs; achieving the ambitions regarding zero-emission waterborne transport will be impossible without the proper framework conditions in place linked to social implications.

In 2021, the maritime sector was included in the **Emission Trading System (ETS)** mechanism⁸⁷, aimed at reaching a faster decarbonisation through capping maritime transport emissions as part of the overall ETS cap. The EU ETS needs to be carefully taken into consideration to plan activities with a greater degree of certainty, so as to keep the maritime manufacturing industry internationally competitive (thus being able to face countries such as China and South Korea on the international market) and respond to the increasing need for greater diversification of sustainable sources.

85. European Commission, *Reducing emissions from the shipping sector*, https://climate.ec.europa.eu/eu-action/transport/reducing-emissions-shipping-sector_en, accessed 4 May 2023.

86. The objectives and implications of the European Green Deal and the Fit for 55 package are analysed in more depth in the Background chapter of this report.

87. Liese P., *Revision of the EU emission trading system (ETS)*, [https://www.europarl.europa.eu/legislative-train/package-fit-for-55/file-revision-of-the-eu-emission-trading-system-\(ets\)](https://www.europarl.europa.eu/legislative-train/package-fit-for-55/file-revision-of-the-eu-emission-trading-system-(ets)), 20 March 2023.

Another ambitious goal is the **FuelEU Maritime initiative**: this 2021 regulation aims at reducing the greenhouse gas emissions in the maritime sector and promoting different and more sustainable sources to comply with the Green Deal and Fit for 55 objectives. Despite being a particularly ambitious requirement towards the decarbonisation of the sector, the FuelEU Maritime initiative will certainly require an adequate level of low-carbon fuels that are safe enough so as not to endanger all the workers involved⁸⁸; also, the FuelEU Maritime initiative does not properly address the social dimension, as risks need to be understood and taken care of to prioritise the safety of workers⁸⁹.

The implementation of both the EU ETS and FuelEU Maritime initiatives will likely have consequences for fair competition in the port sector, more specifically when applied to extra-EU traffic calling or departing from EU ports:

- ▶ Calls at non-EU ports could become more economically attractive (e.g. the UK, North Africa).
- ▶ Competitiveness of EU ports could be put at risk.

These measures will severely affect EU ports in their competitiveness with other neighbouring non-EEA trans-shipment ports: traffic could easily be shifted toward alternative trans-shipment nodes that are close but outside the EEA region – damaging European ports while strongly reducing the schemes emission reduction effectiveness. Mitigation measures to the implementation of Fit for 55 need to be designed in order to reduce its negative impact on EEA trans-shipment ports, and in order to:

- ▶ avoid the creation of new market distortions;
- ▶ preserve the Green Deal objectives;
- ▶ ensure a common level playing field between EEA and non-EEA trans-shipment ports competition.

The **Energy Taxation Directive** (already technically in force since 2003 but revised with new objectives in the framework of the Fit for 55 package in 2021⁹⁰) also aims at reducing the use of certain sources through taxing proportionally the most polluting ones, with a clear impact of course on shipbuilding.

The **Renewable Energy Directive** is also going to affect and bring necessary changes and challenges to the maritime industry: the goal of this 2021 regulation is to share at least 40% of renewable energies by 2030 and to reduce the GHG intensity by 13% by the same year⁹¹.

Maritime infrastructure is also part of the plan: the ports that see at least 50 port calls by large passenger vessels (or 100 port calls by container vessels), must be equipped to provide electricity with recharging stations located shore-side by 2030⁹².

Lastly, the European Commission in June 2023 presented **five different legislative proposals** to modernise the EU rules on maritime safety, and to prevent water pollution from ships. These steps are due to the number of accidents in the sector, of which 2,000 were reported each year⁹³. The package of proposals includes:

- ▶ flag state inspections based on international rules and the European Maritime Safety Agency (EMSA) training courses to enhance the controls that Member States have over their fleets;
- ▶ state control: to cover other additional international rules (such as the removal of wrecks), and to reflect new requirements such as those looked at for inspections to check if the ship is safe and the quality of its environmental performance (this specific proposal will be extended to fishing vessels);

88. ECSA (European Community Shipowners' Associations), ICS (International Chamber of Shipping), *FuelEU Maritime: Avoiding unintended consequences*, 2021, p. 4. Available at: <https://www.ics-shipping.org/wp-content/uploads/2021/05/FuelEU-Maritime-Avoiding-Unintended-Consequences-1.pdf>.

89. ETF, *Occupational health and safety: FuelEU Maritime lacks long-term vision*, <https://www.etf-europe.org/occupational-health-and-safety-fueeu-maritime-lacks-long-term-vision/>, 15 July 2021.

90. NAPA, *How the Fit for 55 legislation will affect the shipping industry – and how you can prepare*, <https://www.napa.fi/eu-fit-for-55-for-shipping/>, 2 February 2022.

91. ETF, *Maritime Transport Section. JT4 Mobility – Online Maritime Workshop*, 31 January 2023.

92. European Commission, *European Green Deal: ambitious new law agreed to deploy sufficient alternative fuels infrastructure*, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1867, 28 March 2023.

93. European Commission, *Maritime safety: new proposals to support clean and modern shipping*, https://transport.ec.europa.eu/news-events/news/maritime-safety-new-proposals-support-clean-and-modern-shipping-2023-06-01_en, 1 June 2023.

- ▶ establishment of national accident investigation bodies;
- ▶ as far as ship pollution is concerned, expansion of the scope of polluting substances (now including sewage, rubbish and discharge waters);
- ▶ reinforcement of CleanSeaNet (the EMSA surveillance and information sharing database) to facilitate the cooperation between Member States in case of cross-border ship-source pollution incidents;
- ▶ establishment of a strengthened legal framework for penalties and their application, to facilitate legal action from national authorities in case of illegal discharge.

When focusing on the **fisheries sector**, on 21 February 2023, the European Commission formalised a pathway for reducing its emissions, with the start of a consultation among the stakeholders involved⁹⁴. Discussions are still ongoing, but some points already emerge as crucial when it comes to people's working conditions. An example is the gross tonnage limitation, a criterion of the Common Fisheries Policy to control the fishing capacity of the fleet. The ETF and its affiliates have asked for years to exclude from the calculation of the gross tonnage the space dedicated to the crew on board: this will be an incentive for vessel owners to offer better and bigger cabins, sanitary facilities and common spaces.

The Commission has always refused to open the definition of the gross tonnage limitation to allow better living conditions on board, although this has been identified by all as a key factor to attract more young workers and women to the sector. As the introduction of alternative fuels and engines will require more volume on board, the limit of the gross tonnage limitation will need to be addressed. It is not feasible to review the definition of gross tonnage to allow the decarbonisation, while not reviewing it to allow better living conditions for the crew⁹⁵. In parallel, the energy transition for fisheries will need to be prepared in order to equip the crew with the necessary skills to manage and stock the new fuels and safely operate the new engines. Coastal supply of the new fuels, in particular for small fishing ports, is a matter of concern and will also play a key role for the survival of the sector.

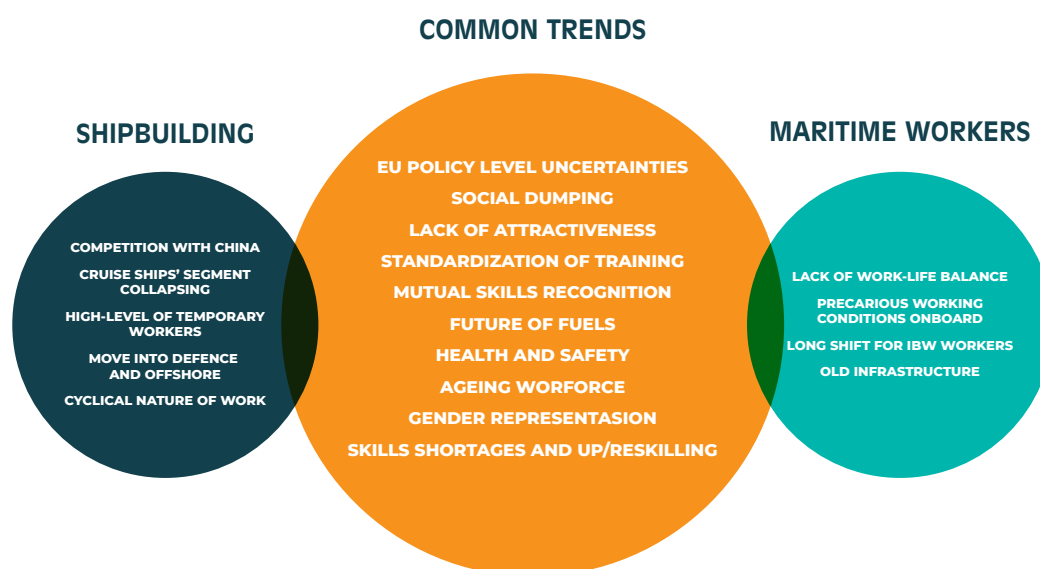


Figure 6: The maritime sector in the context of the digital and green transition: shipbuilding, maritime transport, fisheries, inland navigation, and dockers' perspectives.

94. Struna H., *Commission announces carbon reduction plan for fisheries*, <https://www.euractiv.com/section/agriculture-food/news/commission-announces-carbon-reduction-plan-for-fisheries/>, 23 November 2022.
 95. ETF, *Maritime Transport Section. JT4 Mobility - Online Maritime Workshop*, 31 January 2023.

The above mechanisms are going to affect the maritime sector from different perspectives, including the social one: a holistic approach is needed to better understand what greening maritime means for workers in terms of employment, skills and working conditions, in order to achieve a proper sustainability that also includes the social dimension. The below figure summarises the main common trends currently taking place in the maritime sector, as well as those that are affecting more specifically shipbuilding vs. maritime transport and the other sectors (fisheries, dockers, inland navigation). More details on each area of employment, skills and working conditions are presented in the next paragraphs.

2. The sector today and the pathway towards a Just Transition: focus on employment, skills and working conditions

2.1 Employment

The employment macro area of the maritime sector is already suffering from some specific issues, some of which are likely going to be impacted by the twin transition. Starting with the current problems common to both categories of workers, the main employment issues refer to:

- ▶ **Ageing of the maritime workforce:** many current employees entered the sector very young and are now about 65-70 years old. This fact calls for the need to recruit new workers.
- ▶ **Lack of attractiveness of the sector**, which makes it difficult to recruit more women as well as young and talented people.
- ▶ **Social dumping**, where poor working conditions are associated with lower wages and longer working hours. It has often been noted that there is not always willingness to explain to non-European workers the regulation of the industry, as well as giving all the necessary information in a simple and understandable English language⁹⁶.
- ▶ **Gender inequalities** and strong negative stereotypes towards women.
- ▶ **Lack of an industrial sectoral strategy** for the maritime sector may lead to the loss of the European current maritime capacity, competence and, ultimately, employment.
- ▶ Jobs are often perceived as **insecure**.

For **maritime workers**⁹⁷, further specific factors can be underlined:

- ▶ **Younger generations do not want to spend the amount of time away from their families** that is involved in working on board. This condition is also worsened by the fact that the internet connection at sea is often absent, and the periods spent on board have also become longer due to sensitive geopolitical situations (such as the current war in Ukraine⁹⁸).
- ▶ **Conditions on board are increasingly precarious**, due to ageing vessels and climate change, which in turn is leading to severe weather.

On the **shipbuilding** side⁹⁹, the following can also be evidenced:

- ▶ The **rise of the Chinese and South Korean markets:** China has in fact invested about 40 billion in port infrastructure (which is critical for sea trade), easily beating all its rivals in the Asian market and earning the title of "manufacturer in chief". The Chinese and South Korea markets are securing all orders for new-built ships, including green vessels, whilst European shipyards are still suffering from the impacts of the pandemic and from the consequences of the war in Ukraine, with jobs in European maritime sectors at risk.
- ▶ The **collapse of the cruise ship segment**, which is still having an impact, while the demand for green vessels is increasing.

From a social dimension, the transition is potentially going to exacerbate such already existing issues, by bringing more uncertainty with regard to:

- ▶ **Late signals arriving from the EU policy level** about the future of the sector, and consequently making it more difficult to recruit new people who will probably be reluctant to enter a sector whose future is uncertain.
- ▶ Possible **negative consequences for micro and small companies**: in the absence of a 'certain' European framework on future technologies, it is more complex for small/medium-sized companies to invest in a technology that may later turn out to be difficult to implement in the long-term. This consequently worsens the attractiveness of the sector, which is perceived as even more insecure by young people.
- ▶ **Lack of anticipation and the unpredictability of the future fuels** required to reach a successful decarbonisation.

2.2 Skills

The main skills issues that concern both categories of workers are:

- ▶ **a substantial lack of skilled workers** in the sector;
- ▶ **a lack of mutual skills recognition**, which brings difficulties for people to receive the same wages and level of training in the different countries¹⁰⁰;
- ▶ **a lack of adequate standardised training programmes** to enter the sector.

For maritime workers specifically, the **lack of homogeneity** in the skills matured by seafarers entering the industry is also an issue, making the development of standardised training programmes even more difficult ¹⁰¹.

In the framework of a greener and more digital maritime sector, the main challenges for workers will be the following:

- ▶ The already existent lack of skills is going to be accentuated by the transition, as **new technologies and fuels will require proper training programmes** to be safely and successfully dealt with. The risk of this need, if not properly fulfilled, is a massive exodus from the sector¹⁰² by people that are not being offered the chance to gain the necessary knowledge and practice to successfully manage their jobs.
- ▶ The fact that **the majority of the workforce is ageing** makes the transition towards a more digitalised sector challenging, as it is **difficult to upskill and reskill a 70+-year-old worker**.
- ▶ Training and reskilling programmes will require **massive funding and public investments**.
- ▶ **Finding competent trainers** to manage new training programmes will be harder.

96. ETF, World Maritime University, *The Maritime Commons: Digital Repository of the World Maritime University. Social Security Rights of the European resident seafarers – a joint report of the European Transport Workers' Federation and World Maritime University*, 2022.

97. ETF, Maritime Transport Section. *JT4 Mobility – Online Maritime Workshop*, 31 January 2023.

98. Interview with ETF members, November 2022.

99. IndustriAll Europe, *Just Transition. Manufacturing workers' perspective in the shipbuilding industry Workshop*, 31 January 2023.

100. Interview with IndustriAll Europe members, November 2022.

101. ETF, Maritime Transport Section. *JT4 Mobility – Online Maritime Workshop*, 31 January 2023.

102. Ibid.

2.3 Working conditions

When it comes to working¹⁰³ conditions, the main general issues for both shipbuilding and maritime transport workers relate of course to all the risks connected to **social dumping**. Social dumping is a practice that consists of giving workers lower-than-normal wages and poor employment conditions (such as longer working hours, a potentially dangerous work environment with health and safety risks and absent or insufficient safety regulations)¹⁰⁴.

Gender inequality is also an issue that needs consideration, as well as the conditions of women on board: women do not operate in an optimal environment in the maritime sector, as they tend not to have separate facilities, which makes their work very uncomfortable.

Moreover, **infrastructure and ports** tend to be very old and affected by climate change, making conditions physically challenging for employees¹⁰⁵.

Regarding maritime transport specifically, there is a substantial **difference between the conditions of seafarers and land workers**: seafarers are in fact excluded from several Directives and Regulations (including the Posting of Workers Directive (PWD)), and in general their wages and working conditions standards are lower. This issue needs careful attention, as there is a risk that seafarers will become one of the categories with fewer rights at European level¹⁰⁶.

Lastly, **Inland Waterways Navigation** deserves specific mention as the conditions of workers' shifts in this area tend to be around 20 hours a day, with extremely low wages and heavy reliance on tips. The sector is also marked by frequent abuses in the workplace, making the general employment picture particularly worrying, and raising the need for action at European level to develop a framework to improve the workers' conditions¹⁰⁷.

The working conditions of the maritime sector are also going to be strongly impacted by the transition, especially given the fact that **new technologies and fuels** could be particularly harmful or dangerous to workers. Engineer officers and crew will face the greatest safety challenges with energy sources for propulsion, including high temperatures, high pressures, high voltages, and toxicity and corrosivity. Furthermore, manoeuvring, maintenance, explosion hazards and firefighting are also challenges in terms of safety and competence.

3. The way forward: main common opportunities, challenges and best practices

The maritime sector will surely face different challenges in the pathway towards decarbonisation. While the transition may represent an opportunity for the modernisation of the sector, it may severely impact workers in shipbuilding, seafarers, dockers and fisheries and inland navigation workers if not properly addressed.

Managing new fuels and technologies safely is a common issue, together with the lack of attractiveness for new talents and an ageing workforce: the often-obsolete infrastructure and the difficult work-life balance are important deterrents in this sense. A new sectoral image, together with a change of perceptions, is even more needed. To promote a fair transition for workers, gender equality will need to be guaranteed in the sector for women to have the same career opportunities as men.

In this context, social dialogue will play a key role in ensuring that employees' interests are respected during this time. Active **social dialogue on fisheries** at EU level includes the European Transport Workers' Federation (ETF), on the workers' side, and, on the employers' side, Europêche (the Association of National Organisations

103. ETF, *Maritime Transport Section. JT4 Mobility – Online Maritime Workshop*, 31 January 2023; IndustriAll Europe, Just Transition. Manufacturing workers' perspective in the shipbuilding industry Workshop, 31 January 2023.

104. For more information on the practice of social dumping, please take a look at this Norwegian case: Kvalsvik P.-I., *LO-sjefen tornar mot verfta: – Det er slaveliknande kontraktar*, https://www.nrk.no/mr/lo-sjefen-ut-mot-verftsnaeringa-_arbeidsministeren-varslar-storreingjering-i-arbeidslivet-115954043, 4 May 2023.

105. ETF, *Maritime Transport Section. JT4 Mobility – Online Maritime Workshop*, 31 January 2023.

106. Communication from ETF members, July 2023.

107. Interview with ETF members, November 2022.

108. Ibid.

of Fishing Enterprises in the EU), and the fisheries section of COGECA – General Confederation of Agricultural Cooperatives in the European Union. As regards **maritime transport**, the workers' organisation involved is the ETF, while the employers' organisation concerned is the European Community Shipowners' Associations (ECSA). Social dialogue in this sector covers sea and coastal passenger and freight transport support activities for maritime transportation. For **inland waterways**, the ETF and the employers' organisations the European Barge Union (EBU) and the European Skippers' Organisation (ESO) are actively involved.

As far as **shipbuilding** is concerned, the social partners involved are, on the workers' side, IndustriAll European Trade Union and, on the employers' side, the Shipyards' & Maritime Equipment Association of Europe (SEA Europe). The social dialogue in this sector covers shipbuilding, ship repair, maintenance and conversion and the manufacture of maritime equipment¹⁰⁸.

With the objectives of delineating the **common opportunities and challenges** of all the maritime sector and to address them with a **shared approach**, open points to be tackled can be summarised as follows:

AT POLICY LEVEL:

- ▶ Advocating for a clear **EU policy and strategy for the maritime sector**.
- ▶ Accompanying the transition with constant information given to the workers involved regarding the possible **developments in the sector** (as there is still a lot of uncertainty regarding future fuels).
- ▶ Establishing effective policies to counter **social dumping**, by putting and ensuring specific standards for workers in the maritime sector, i.e. adequate wages and decent treatment of the employees.
- ▶ Constant **involvement of unions and workers' representatives** in delineating Just Transition plans.

AT EMPLOYMENT AND SKILLS LEVEL:

- ▶ **Informing young people** about the career opportunities in the maritime sector. The promotion of a new sectoral image is key. Leveraging on innovative training programmes that show sustainability commitments, new technologies, better working conditions and hands-on experience is encouraged. Young people want to see an impact on what they do.
- ▶ Necessity for every worker to enter the maritime sector with a **specific level of matured training and skills**. This recommendation is aimed at creating training programmes that are useful for each employee that enters the maritime industry.
- ▶ Managing the digital and green transition with the **design of training programmes that prepare workers for the digital/green skills required** and create efficient upskilling and reskilling programmes. There is a need to hire qualified and prepared trainers.
- ▶ **Inclusion of women** should be encouraged in the maritime sector, awareness of the possibility of their involvement can be facilitated thanks to campaigns conducted in schools or institutions, which can help with the spreading of information on their career possibilities.

AT WORKING CONDITIONS LEVEL:

- ▶ **Replacing and/or renovating old infrastructure** to ensure the safety of workers.
- ▶ For **fisheries**, excluding the space for the crew on board from the **gross tonnage calculation**, as ships' owners are keener to reduce the living space as much as possible to maximise the volume to stock the fish, creating uncomfortable living conditions for employees on board.
- ▶ Carefully preparing workers to **safely manage new technologies and fuels**.

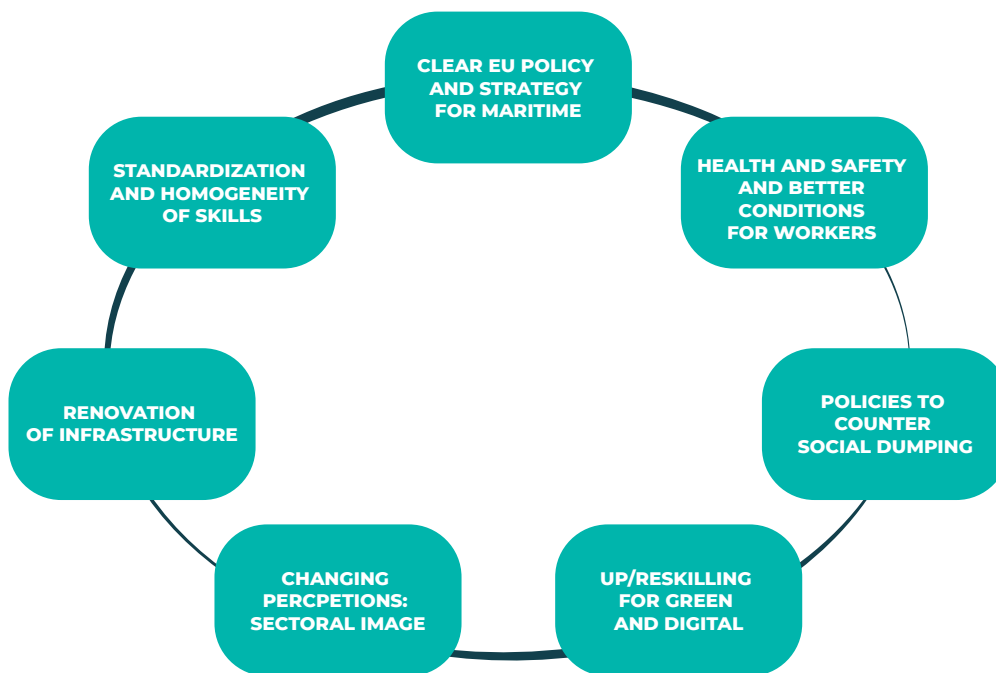


Figure 7: Ensuring a Just Transition for the maritime sector: main common action points

There are already some best practices and studies conducted at EU and national level which it is encouraged to consider, as their application and replication can be extremely useful in ensuring the fairest possible harmonisation of the transition. The table below gives some examples:

BEST PRACTICE	DESCRIPTION	WHERE
GICAN Project ¹⁰⁹	Strongly focused on the employment of young people, it offers different job opportunities that fit into the digital and green transition; some examples are workplaces, such as engineers, data scientist and cybersecurity experts	France
White Book Project ¹¹⁰	It collects the name, contacts and main skills of workers across the country in order to facilitate their employment in the maritime sector	Spain
EDINNA ¹¹¹	Inland Navigation Waterways: an organisation established to develop a harmonised education, training education, training and certification system for inland waterway personnel	EU level
USWE Project ¹¹²	Project analysing the impact of technological change in existing occupations and the future skills needed	EU level
REDMAR II ¹¹³	It ensures that women are aware of their career possibilities in the maritime industry, with a specific focus on the fishing vessels	Spain

BEST PRACTICE	DESCRIPTION	WHERE
Norwegian Maritime Authority ¹¹⁴	It ensures that workers' conditions in the sector are decent, and this is guaranteed through supervision and the development of rules and regulations for every vessel that navigates the Norwegian waters	Norway
WESS Project ¹¹⁵	Under the WESS project, the ETF and ECSA, conducted studies on the impact of digitalisation on board and on enhancing the participation of women in EU shipping, including through the development of campaign materials, a career booklet and an online survey and the translation into 15 languages of the ICS-ITF international guidelines on workplace harassment and bullying.	EU level
SkillSea Project ¹¹⁶	<p>The SkillSea project aims to ensure that Europe's maritime professionals possess key digital, green and soft management skills for the rapidly changing maritime labour market. It seeks to not only produce a sustainable skills strategy, but also to increase the number of these professionals – enhancing the safety and efficiency of this vital sector.</p> <p>Main deliverables:</p> <ul style="list-style-type: none"> ■ The Maritime Education and Training network was launched, and a memorandum of understanding was signed. ■ Other key deliverables of the SkillSea project: the toolbox & the educational packages. 	EU level
CESNI ¹¹⁷	European committee for drawing up standards in the field of inland navigation. This resolution promotes the development of uniform, modern, user-friendly requirements, and considers the CCNR's "Vision 2018" for the sustainable development of inland navigation. The creation of this new working body is in line with the desire of the CCNR, shared by the European Union, to reinforce governance at the European level, particularly in the field of regulations governing inland navigation.	EU level

Table 5: Best practices in the maritime sector

109. GICAN, *GICAN*, <https://gican.asso.fr/>, accessed 12 May 2023.

110. Interview with IndustriAll Europe members, November 2022.

111. EDINNA, *About EDINNA*, <https://www.edinna.eu/about-edinna/>, accessed 15 May 2023.

112. USWE Project, *USWE Project*, <https://www.usweproject.eu/>, accessed 15 May 2023.

113. European Commission, *Women on board!*, https://oceans-and-fisheries.ec.europa.eu/news/women-board-2022-03-31_en, 31 March 2022; <https://redmar.es/>.

114. NMA, *Norwegian Maritime Authority*, <https://www.sdir.no/en/>, accessed 15 May 2023.

115. WESS Project, *Contributing to an Attractive, Smart and Sustainable Working Environment in the Shipping Sector*, <https://wessproject.eu/>, accessed 7 July 2023.

116. ETF, *Redefining maritime transport professions*, <https://www.etf-europe.org/redefining-maritime-transport-professions/>, 1 June 2023.

117. CESNI, *About CESNI*, <https://www.cesni.eu/en/about-cesni/>, accessed 6 July 2023.



C. THE AVIATION AND AEROSPACE SECTOR

1. The aviation and aerospace sector in the framework of the EU decarbonisation strategy

For the purpose of this study, the present chapter covers both aviation workers and workers in aerospace manufacturing, in order to define and establish a common ground for action in the context of this joint project.

Aviation has long been considered as one of the “fastest-growing sources of emissions”¹¹⁸ and in 2017, direct emissions from this sector were calculated to be 3.8% of the European Union’s total emissions¹¹⁹. According to the European Commission, aviation emissions are growing faster, and they specifically rose 5% year on year between 2013 and 2019¹²⁰. In this context, it is imperative to better understand how EU initiatives are moving to accelerate its decarbonisation, and consequently assess the **implications for its entire workforce**, which are predicted to be highly impactful.

The aviation sector has been included in the **EU Emission Trading System** since 2012¹²¹. On 18 April 2023, the reform of the ETS was adopted by the European Parliament, where an agreed revision of the ETS for aviation was included: this will phase out the free allowances to the aviation sector by 2026 and promote the use of sustainable aviation fuels¹²². The revision was in fact proposed in 2022, laying down the following timeline¹²³:

- ▶ Decreasing the free allocation of allowances by 25% by 2024
- ▶ Decreasing the free allocation of allowances by 50% by 2025
- ▶ Ensuring a total phase out of allowances by 2026

118. European Commission, *Reducing emissions from aviation*, https://climate.ec.europa.eu/eu-action/transport-emissions/reducing-emissions-aviation_en, accessed 17 May 2023.

119. Ibid.

120. Dubois L, *EU agrees rules to boost use of sustainable fuels in aviation*, <https://www.ft.com/content/d04d49ce-a311-4542-9b8c-92b81e53292a>, 26 April 2023.

121. European Commission, *Aviation and the EU ETS*, https://climate.ec.europa.eu/eu-action/european-green-deal/delivering-european-green-deal/aviation-and-eu-ets_en, accessed 17 May 2023.

122. European Parliament, *Fit for 55: Parliament adopts key laws to reach 2030 climate target*, <https://www.europarl.europa.eu/news/en/press-room/20230414IPR80120/fit-for-55-parliament-adopts-key-laws-to-reac>

123. European Parliament, *Fit for 55: deal on more ambitious emissions reduction for aviation*, <https://www.europarl.europa.eu/news/en/press-room/20221205IPR60611/fit-for-55-deal-on-more-ambitious-emissions-reduction-for-aviation>, 7 December 2022.

Another European initiative that deserves mention is **ReFuelEU Aviation**, a special measure, and also part of the Fit for 55 Package. The ReFuelEU Regulation, proposed by the European Commission in July 2021, aims to increase the share of Sustainable Aviation Fuels¹²⁴ (SAFs), to reduce the emissions and reach the objectives of decarbonisation¹²⁵. In April 2023, the Council and the European Parliament reached a more detailed agreement on this subject, proposing that all fuels uplifted by aircraft operators at EU airports should contain a minimum share of 2% of SAFs by 2025, which should rise every five years to reach 70% by 2050¹²⁶.

In the public-private domain, the 2022 **Toulouse Declaration** represents another initiative involving many different European stakeholders, such as the ETF, UNI Europa, the European Federation of Food, Agriculture, and Tourism Trade Unions (EFFAT), IndustriAll Europe, the ECA¹²⁷, air navigation service providers (ANSPs), airports and airlines. Its aim is to recognise the need for decarbonisation of aviation, but also to touch on some important demands for social sustainability to underpin a Just Transition towards carbon neutrality. A more granular impact on employment is in fact encouraged, together with important exercises to map the skills gap, and the up/reskilling processes to ensure job to-job transition¹²⁸. The main points explored in the Declaration include the need for increased international cooperation, by inviting other countries to collaborate and better reach net zero CO2 emissions¹²⁹.

At international level, another important initiative is the Carbon **Offsetting and Reduction Scheme for International Aviation (CORSIA)**¹³⁰, developed within the International Civil Aviation Organization (ICAO)¹³¹. Starting with a pilot phase in 2021 and as of early 2023, 115 states had announced their intention to participate. CORSIA offers a harmonised way to reduce emissions while respecting the different capabilities of the ICAO Member States, by offsetting the emissions that cannot be reduced through technological improvements and the use of sustainable aviation fuels, as well as operational improvements¹³². True decarbonisation of the sector can only happen if all international stakeholders come together to agree on ambitious and binding commitments, as Europe cannot solve the problem alone¹³³.

In September 2022, the ITF also submitted a working paper to the ICAO, reiterating the objective of reaching a Just Transition during the greening of the sector. This working paper involved many social partners, such as the International Transport Workers' Federation (ITF), the European Transport Workers' Federation (ETF), IndustriAll Global Union and IndustriAll European Trade Union¹³⁴, and represented an important step towards the awareness on the part of the international aviation community, even if not all of the demands were included in the final ICAO Resolution¹³⁵.

Trade unions insist that the green aviation ambition of the EU agenda should be carefully assessed when it comes to the potential impacts on its workforce (for both workers in aerospace manufacturing and aviation workers). To ensure that no worker is left behind, it is important to **pinpoint the main common opportunities and challenges** to achieve both environmental and social sustainability objectives.

124. Sustainable aviation fuels include biofuels, recycled carbon fuels and synthetic fuels (such as e-kerosene):

Dubois L., *EU agrees rules to boost use of sustainable fuels in aviation*, <https://www.ft.com/content/d04d49ce-a311-4542-9b8c-92b81e53292a>, 26 April 2023.

125. European Parliament, *ReFuelEU Aviation initiative: Sustainable aviation fuels and the fit for 55 package*, [https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2022\)698900](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2022)698900), 8 December 2022.

126. European Council, *Council and Parliament agree to decarbonise the aviation sector*, <https://www.consilium.europa.eu/en/press/press-releases/2023/04/25/council-and-parliament-agree-to-decarbonise-the-aviation-sector/>, 25 April 2023; and Dubois L., *EU agrees rules to boost use of sustainable fuels in aviation*, <https://www.ft.com/content/d04d49ce-a311-4542-9b8c-92b81e53292a>, 26 April 2023.

127. A full list of the airports involved in the initiative can be found here: <https://www.aci-europe.org/toulouse-declaration>; and a list of other partners is provided here: https://news.industriall-europe.eu/documents/upload/2022/2/637798546324867858_Joint%20press%20release%20-%20Toulouse%20declaration%20-%20final.pdf.

128. IndustriAll Europe position paper, *Sustainable Aviation: for a greener European aviation sector with workers at its core*, 30 May 2023, 2023/148, p. 7.

129. Toulouse Declaration on future sustainability and decarbonisation of aviation, 4 February 2022. Available here: <https://www.aci-europe.org/toulouse-declaration>.

130. ICAO, *Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)*, <https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx>, accessed 18 May 2023.

131. ICAO is a United Nations specialised agency founded in 1944 that aims to achieve sustainable growth of the global civil aviation system (www.icao.int).

132. Ibid.

133. IndustriAll Europe position paper, *Sustainable Aviation: for a greener European aviation sector with workers at its core*, 30 May 2023, 2023/148.

134. ICAO working paper of September 2022, 41st Assembly session. Available at: <https://www.icao.int/Meetings/a41/Pages/default.aspx>.

135. IndustriAll Europe Workshop presentation, *Just Transition for the Aviation Sector: Where Are We Now*, 31 January 2023.

2. The aviation and aerospace sector today and the pathway towards a Just Transition: focus on employment, skills and working conditions

Climate-safe mobility implies an immediate decarbonisation pathway for aviation. The sector is one of the transport means for which great technological advancement is required in order to substantially reduce emissions, and many options have been paving the way.

Among the technology options for engine and airframe, principal opportunities for fuel reduction come from improvements in aerodynamic efficiency, aircraft mass reduction, and propulsion system improvements. However, at present, such improvements do not compensate for the growth in emissions of CO₂. The same happens for operational improvements for navigation, whose scope to reduce CO₂ emissions is relatively limited¹³⁶.

The most practical solution to reduce CO₂ emissions is to switch to **Sustainable Aviation Fuels (SAFs)**¹³⁷. As it was previously highlighted, SAFs could be a viable solution to ensure a less polluting sector, and most current engines can already support the use of SAFs. According to the International Air Transport Association (IATA), SAFs will be responsible for 65% of the reduction in emissions needed by aviation to reach net-zero emissions in 2050¹³⁸. However, according to Eurocontrol, in the “base” and most likely scenario, the improvement is only 41%¹³⁹. According to the IEA, planned production capacity for SAFs will provide just a small fraction of jet fuel demand by 2027, thus opening the possibility for more demand restraint solutions to comply with the Net-Zero Scenario by 2050. For this, supportive policies will be needed to help reach the EU objectives¹⁴⁰.

CONTRIBUTION TO ACHIEVING NET ZERO CARBON IN 2050

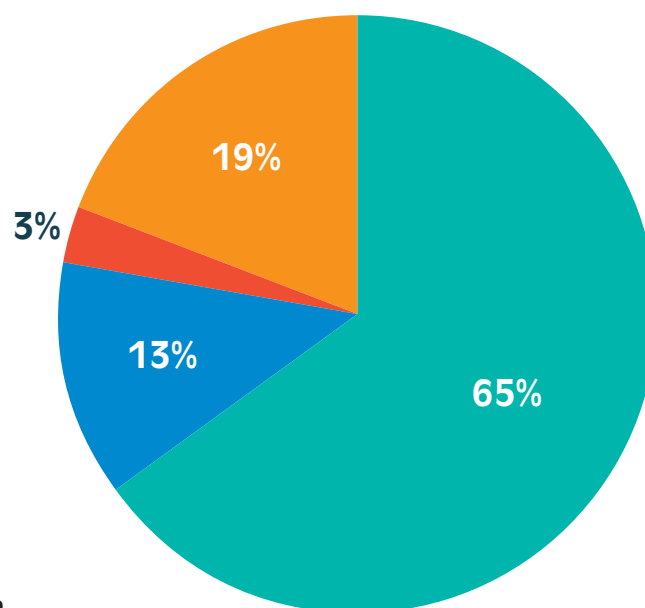
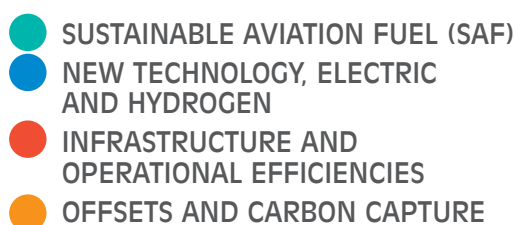


Figure 8: Contributions to achieving Net-Zero Carbon in 2050

The use of SAFs seems to be the most promising solution even if several precautions need to be taken to ensure a safe and feasible transition process for workers. This requires support from Member States and the European institutions to avoid any negative consequence in terms of employees' safety, as well as ensuring that workers are well-prepared to manage the new fuels¹⁴². Also, another challenge in the implementation

136. IPCC Report, *Climate Change 2022: Mitigation of Climate Change*, 2022, pp. 1087-1089. Available at: https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_FullReport.pdf.

137. Ibid.

138. IATA Report, *Net Zero 2050: Sustainable Aviation Fuels*, 2022. Available at: <https://www.iata.org/en/iata-repository/pressroom/fact-sheets/fact-sheet---alternative-fuels/>.

139. Eurocontrol, *Aviation Outlook 2050: air traffic forecast shows aviation pathway to net zero CO₂ emissions*, <https://www.eurocontrol.int/article/aviation-outlook-2050-air-traffic-forecast-shows-aviation-pathway-net-zero-co2-emissions>, June 2022.

140. IEA, *Aviation*, <https://www.iea.org/energy-system/transport/aviation>, accessed 12 July 2023.

141. IATA Report, *Net Zero 2050: Sustainable Aviation Fuels*, 2022. Available at: <https://www.iata.org/en/iata-repository/pressroom/fact-sheets/fact-sheet---alternative-fuels/>.

142. ETF, *Greening the aviation sector: trade unions insist on a Just Transition*, <https://www.etf-europe.org/greening-the-aviation-sector-trade-unions-insist-on-a-just-transition/>, 24 March 2023.

of SAFs is the possible competition with the agricultural sector. The ReFuelEU proposal prevents the use of biofuels that would use land required for food, and instead focuses on the use of waste products from the agriculture and forest sectors as a basis for SAF. However, there are still concerns that opportunistic suppliers may use agricultural land solely for the purpose of creating waste that can be used for SAF. There is also concern that the scope of this is only limited to the EU, as other major aviation markets, such as the US, have not made such commitments and this falls outside the scope of CORSIA. Trade unions and some members of the European aviation industry publicly stated in the second JT4Mobility project aviation workshop held in March 2023, that the production of SAFs should not impact food production, and as such, this must be monitored going forward.

Finally, another assessment that needs to be made when talking about SAFs is their cost (three times that of kerosene): SAFs will in fact become increasingly expensive until supply matches demand, leading to the necessity of receiving European aid in order to make the procurement of these resources possible in the short to medium term. Other hybrid pathways, for example the hydrogenation of biofuels (the hydrogen assumed to be generated with low-carbon energy), could increase the output and improve the economic feasibility of bio-based SAF.

Other alternatives to SAFs are synthetic fuels, involving the use of low-carbon electricity. Although needing less land and water than SAFs, their implementation is still at a very early stage and low carbon-energy supply and costs are a burden¹⁴³. Another possible resource that can be implemented is liquid hydrogen. Studies on its efficiency and benefits are still ongoing, even if there are many infrastructural barriers, such as the increased volume requirement: new aircraft designs would be needed for longer distances¹⁴⁴.

2.1 Employment

By taking the social perspective as the main reference point when addressing the consequences of decarbonising aviation, the sector is already experiencing some specific issues when it comes to employment trends – some common to both aerospace manufacturing and aviation workers.

Volume of air traffic has been rather unstable in recent years: even if the sector is recovering fairly well from the COVID-19 pandemic¹⁴⁵, its impacts have been devastating for the workforce. Flight levels dropped dramatically during the first months of the pandemic: global air traffic declined by about 66% in 2020 and by 58% in 2021, compared to the 2019 levels, causing impacts on the sector's revenue. The sector experienced an increase in flights in 2022 of about 66% in 2020 and by 58% in 2021, compared to the 2019 levels¹⁴⁶, causing impacts on the sector's revenue. The sector experienced an increase in flights in 2022 of about 15.5% compared to the 2019 levels, thus showing a progressive re-growth of the industry¹⁴⁷. According to the ICAO's recent forecasts¹⁴⁸, **air passenger demand is now increasing rapidly**: in 2024, it is expected to be stronger, at around 4% higher than in 2019, while passengers carried in 2022 increased by an estimated 47% compared to 2021.

In this complex and uncertain scenario, where demand seems to increase but the challenge of greening remains the same, there are several aspects to be considered for both aerospace manufacturing workers and aviation workers.

143. IPCC Report, *Climate Change 2022: Mitigation of Climate Change*, 2022, pp. 1087-1089. Available at: https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_FullReport.pdf.

144. Ibid.

145. Conference Launch with ETF and IndustriAll Europe members, December 2022; and Fearn N., *Aerospace industry grounded by lost jobs and lack of staff*, <https://www.ft.com/content/93736968-8fcf-425f-b8e5-fcd9736d37f6>, 20 July 2022.

146. IATA Report, *Understanding the pandemic's impact on the aviation value chain*, December 2022, p. 6. Available at: <https://www.iata.org/en/iata-repository/publications/economic-reports/understanding-the-pandemics-impact-on-the-aviation-value-chain/>.

147. Pullen J., *Business Aviation Shows Recovery and Growth in 2022*, <https://www.aviationtoday.com/2023/02/08/business-aviation-shows-recovery-and-growth-in-2022/>, 8 February 2023.

148. ICAO, *ICAO forecasts complete and sustainable recovery and growth of air passenger demand in 2023*. Available at: <https://www.icao.int/Newsroom/Pages/ICAO-forecasts-complete-and-sustainable-recovery-and-growth-of-air-passenger-demand-in-2023.aspx>.

The recent ramp-up in production, steered by an increase in demand for new aircraft, and the **current shortage of workers for manufacturing (due to job cuts notably in the supply chain during COVID-19 and the ageing workforce)** may create difficulties for the supply chain to keep up with the demand. But, at the same time, recent policy developments on decarbonising aviation require a change in mobility patterns, thus opening the possibility to a number of factors – such as price increases for flights and demand restraint solutions. In this context, the impact on the current and future workforce is still unknown¹⁴⁹ when it comes to **job transitions** and redeployment. The question is how this can be managed in a socially fair way without downgrading jobs (both from a working conditions' perspective, but also in terms of actual jobs performed). The aviation sector is in fact often perceived as a “lifestyle” by workers, and moving to other areas is not always desirable.

Retention of workers represents another challenge: for aviation workers specifically, people usually remain in one job for just a few years, and this often leads workers to leave their jobs after a while to ensure a better work-life balance, conditions or pay, as it is not affordable to maintain this lifestyle of working in lower-quality companies in the long run¹⁵⁰.

2.2 Skills

When it comes to skills development, this area is also currently experiencing issues common to both aerospace manufacturing and aviation workers.

First, additional **skills shortages** will be seen with the **deployment of SAFs**, for both aviation and workers in aerospace manufacturing. The new sustainable fuels will represent an important challenge in the **up/reskilling processes**, in terms of both new knowledge and green competences, and to ensure workers' safety when handling these new fuels.

Concrete proposals also come from the EU Pact for Skills in Aerospace and Defence ecosystem, which sets out solutions to upskill and reskill around 200,000 employees (30% of current manufacturing workforce) by 2026. Numerical KPIs will need constant monitoring – such as the number of people a) accessing upskilling/reskilling solutions, b) accessing transforming and emerging jobs, and c) moving from declining activities to emerging jobs; but also skill gaps recovered and employment offers at the level of forecasted demand¹⁵¹.

Both the aerospace manufacturing and aviation workers will also need to innovate to **embed new technologies and digital tools** towards Industry 4.0, and this will require new, specific skills. Aviation is progressively requesting **skills and formalisation of training and standards** for jobs mostly occupied by blue-collar workers¹⁵²: this will of course raise challenges, which will always be related to the necessity of a proper training system to ensure that the additional needs for different capabilities are met.

In this regard, the **ageing of the workforce**, especially for the aerospace industry, can represent a further potential challenge when it comes to massive up/reskilling pathways; and similarly, the **lack of solid workforce planning** (which is quite prominent at company level in the aviation sector) may pose other difficulties in establishing standardised mechanisms for up/reskilling.

Lastly, the use of **European funds** and their implementation is also of fundamental importance: the EU is currently investing in R&D of skills forecasting in the aerospace sector, but at the same time, funds are very often implemented elsewhere as production often takes place outside of Europe, thus not representing a concrete help to European companies. In the perspective of a twin transition, this problem will become even more pronounced as new skills will be required, leading to the need for **consistent investments for training**.

149. IndustriAll Europe position paper, *Sustainable Aviation: for a greener European aviation sector with workers at its core*, 2023/148.

Available at: <https://news.industriall-europe.eu/Article/916>.

150. Interview with ETF members, November 2022.

151. Pact for Skills, Aerospace and Defence, ASD Proposal, 10 November 2020.

152. Interview with ETF members, November 2022.

2.3 Working conditions

Focusing on working conditions is fundamental to ensure a Just Transition¹⁵³, a topic particularly sensitive for the aviation sector. The sector is global by definition: this means that not every country will be able to maintain an equal set of rules regarding the general welfare of workers. The difference in rules between countries will need to be assessed in order to ensure fair conditions for all the workers involved.

Aviation workers are already facing a number of serious health risks¹⁵⁴: the **lack of good air quality in the cabin** for cabin crew and pilots, as the air in the cabin can often be contaminated by chemicals such as oil and hydraulic fluid¹⁵⁵; and the fact that ground staff workers (specifically the ones working on the tarmac) have a high risk of **inhaling ultra-fine particles from jet blasts**, which are emitted by aircraft and other machines that operate on the ground, thus increasing the risk of lung and bladder cancer¹⁵⁶.

This current situation can be further amplified by possible new **health and safety hazards arising from new technologies**. For aerospace manufacturing workers, the recent increase in demand may lead to an intensification of working hours: there is a need to ensure **prioritisation of quality jobs over quantity**.

On the topic of **gender inequality**, it has been shown that women are not inclined to receive high paying roles in this sector, such as senior management, pilots, or ATCOs. According to the International Air Transport Association (IATA), the proportion of women holding leadership positions in the sector was just 3% in 2019, and this is mainly due to gender stereotypes that prevent women from entering it¹⁵⁷.

Other factors impacting aviation workers specifically are the **working time of employees**: split shift issues affect mostly the ground handling employees in airports, forcing them to spread their workday over multiple, shorter periods of work rather than one full shift, as well as excessively long shifts for cabin crew workers. Contracts are also something that should be properly considered, as workers in aviation often have **short-term contracts**, which negatively impact worker retention.

Finally, **redeployment** to other transport sectors (those considered more environmentally sustainable) may cause a further deterioration of working conditions, such as **lower wages and possibly longer working hours**. Another risk of the redeployment process is **work-life balance**: if the change from one sector to another is inevitable, there will be the need for a reskilling process for the worker in order to be prepared to work in the new field: this additional training, combined with the temporary continuation of the existing job, can lead to a particularly stressful working period.

The below figure summarises the main common trends currently taking place in the aviation and aerospace sector, as well as those affecting more specifically workers in aerospace manufacturing and aviation workers' employment, skills and working conditions.

153. ETF and IndustriAll Europe JT4Mobility Aviation Workshop presentations of 31 January 2023.

154. ETF, *Sustainable Aviation: Landing Desirable Jobs*, September 2022. Available at: <https://www.etf-europe.org/sustainable-aviation-landing-desirable-jobs/>.

155. Ibid., p. 7.

156. Ibid.

157. Szakal A., *Is gender still holding women back in the aviation industry?*

<https://www.aerosociety.com/news/is-gender-still-holding-women-back-in-the-aviation-industry/>, 13 December 2019.

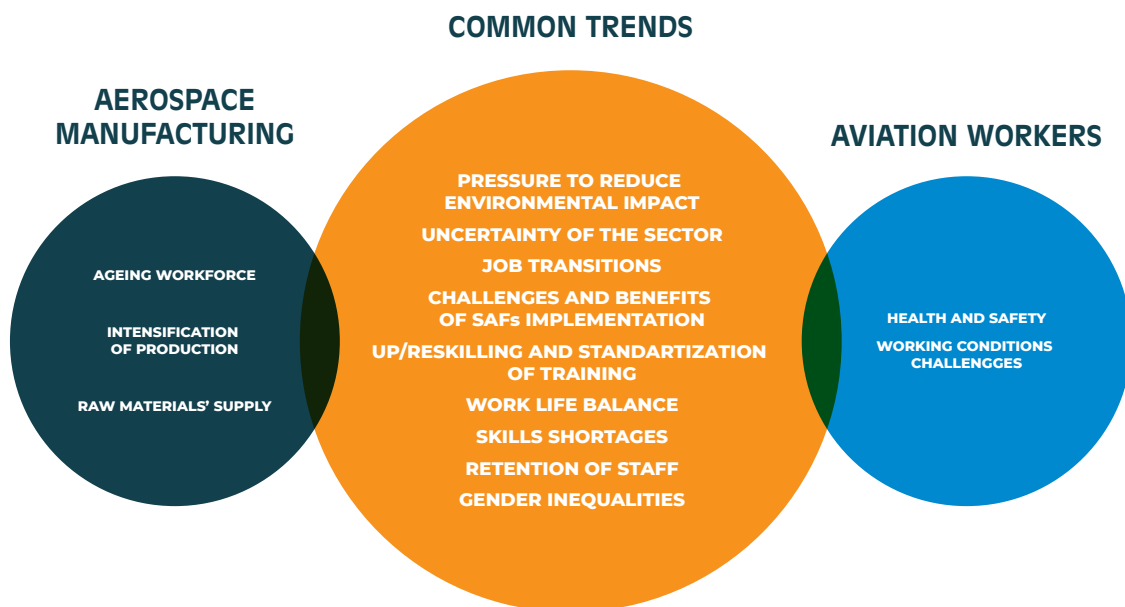


Figure 9: The aviation sector in the context of the digital and green transition: aerospace manufacturing and aviation workers' perspectives

3. The way forward: main common opportunities, challenges and best practices

Aviation will surely face different challenges in the pathway towards decarbonisation. Both aerospace manufacturing and aviation workers will be impacted by the transition and its consequences. In this context, there is the need for a concerted effort by all stakeholders at policy, public, company, airline and airport level. Social dialogue will play a key role towards a successful transition to a more sustainable aviation sector, while guaranteeing social sustainability at the same time.

Active social dialogue at European level covers civil aviation (air crew, ground handling, air traffic management) in both the passenger and freight air transport sectors. It involves the European Transport Workers' Federation (ETF), the European Cockpit Association (ECA) and the Air Traffic Controllers European Union Coordination (ATCEUC) on the workers' side; and on the employers' side, the social partners involved are the Civil Air Navigation Services Organisation (CANSO), Airlines 4 Dialogue (A4D), the European Network Airlines' Association (ENAA), the Airlines International Representation in Europe (Aire), the European Regions Airline Association (ERA), the ACI (Airport Council International) Europe and the Airport Services Association (ASA).

As regards aerospace manufacturing, although there is no active and specific social dialogue for the manufacturing industry at European level (the aerospace sector currently sits with the wider Metal SSDC coordinated by IndustriAll Europe and CEEMET), IndustriAll Europe engages with the employer counterparts at European level, European Aerospace, Security and Defence Industries (ASD), and with the European offices of various aerospace manufacturers. IndustriAll Europe engages with various employer counterparts at European level, including via the European Alliance for Zero-Emission Aviation¹⁵⁸ which launched in November 2022¹⁵⁹ and in the Renewable and Low-Carbon Fuels Value Chain Industrial Alliance¹⁶⁰, which focuses on boosting the production of low-carbon fuels in the context of the RefuelEU Aviation initiative¹⁶¹.

158. IndustriAll Europe Workshop Presentation, *Just Transition for the Aviation Sector: Where Are We Now?*, 31 January 2023.

159. European Commission, *Alliance for Zero-Emission Aviation*, https://defence-industry-space.ec.europa.eu/eu-aeronautics-industry/alliance-zero-emission-aviation_en, accessed 4 July 2023.

160. IndustriAll Europe Workshop Presentation, *Just Transition for the Aviation Sector: Where Are We Now?*, 31 January 2023.

161. European Commission, *Renewable and Low-Carbon Fuels Value Chain Industrial Alliance*, https://transport.ec.europa.eu/transport-themes/clean-transport/alternative-fuels-sustainable-mobility-europe/renewable-and-low-carbon-fuels-value-chain-industrial-alliance_en, accessed 4 July 2023.

Recent position papers delineating clear Just Transition demands for aerospace manufacturing and aviation workers have already been released¹⁶². In this scenario, the added value of this study is to delineate the **common opportunities and challenges between the two sectors**, so as to address them with a shared approach. Open points to be tackled include:

AT POLICY LEVEL:

- ▶ Defining a clear path towards net zero CO2 emissions and increase in the uptake of SAFs.
- ▶ Encouraging the prioritisation of quality over quantity: as planet limit is an issue, outreach activities towards the choice of more efficient routes, the renewal of more polluting cargo jets and having passenger jets flying only at full capacity is of utmost importance.
- ▶ Pushing for social conditionality for public funds supporting a fair and Just Transition.
- ▶ Constant involvement of trade unions and workers' representatives in discussing, agreeing and implementing Just Transition plans for companies.
- ▶ Public authorities' involvement in sectoral action plans, labour market policies, skills forecasting and investments.

EMPLOYMENT AND SKILLS LEVEL:

- ▶ Investing in R&D programmes working on sustainable aviation in the mid and long term, as well as in planning for future skills and in the up/reskilling of the workforce. To achieve this, a collaborative approach on the value chain is essential.
- ▶ In the aerospace manufacturing side, workers' OEMs and first tier suppliers should take responsibility for their supply chain to promote and ensure the sustainability of the industry.
- ▶ Ensuring a work-life balance in case of up/reskilling pathways for workers.
- ▶ Guaranteeing social protection in case of job transitions/losses.

AT WORKING CONDITIONS LEVEL:

- ▶ Prioritising workers' health and safety, especially with the uptake of new fuels.
- ▶ Ending precarious work and short-term contracts to ensure workers' retention and attractiveness.
- ▶ Considering the gender dimensions to achieve a better gender balance.
- ▶ Creating quality jobs with decent pay and conditions to better attract and retain workers.

162. Please refer to IndustriAll Europe position paper, *Sustainable Aviation: for a greener European aviation sector with workers at its core*, 2023/148, available at: https://news.industrial-europe.eu/documents/upload/2023/6/638216432613279517_Adopted_-_Sustainable_aviation_-_for_a_greener_European_aviation_sector_with_workers_at_its_core_-_EN.pdf, and to the ETF position paper available at <https://www.etf-europe.org/wp-content/uploads/2022/09/Sustainable-Aviation-Landing-Desirable-Jobs-ETF.pdf>.

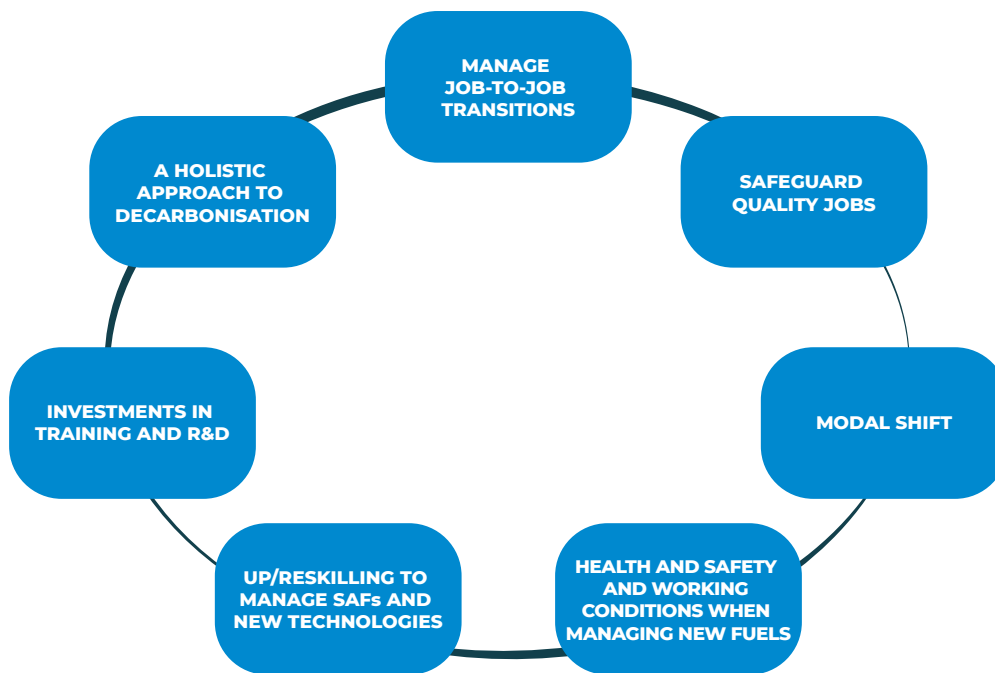


Figure 10: Ensuring a Just Transition for the aviation sector: main common action points

There are already some **best practices** and studies conducted at EU, extra-EU and national level which should be considered, as their application and replication can be extremely useful in ensuring the fairest possible harmonisation of the transition. The table below gives some examples:

163 Airbus, *Airbus steps up its quest for new talent to prepare the future of aerospace*, <https://www.airbus.com/en/newsroom/press-releases/2023-01-airbus-steps-up-its-quest-for-new-talent-to-prepare-the-future-of>, 23 January 2023.
 165 Schiphol Newsroom, *Schiphol, FNV and CNV reach joint agreement*, <https://news.schiphol.com/schiphol-fnv-and-cnv-reach-joint-agreement/>, 1 June 2022.
 166 Toronto Pearson, *Investing in airport workers with Ontario's Skill Development Fund*, <https://www.torontopearson.com/en/whats-happening/stories/ontarios-skill-development-fund>, 3 May 2022.
 167 IndustriAll Europe, Safran, *Safran and IndustriAll Europe reach a European agreement on the development of skills and safeguarding of career paths*, press release, <https://www.safran-group.com/pressroom/safran-and-industriall-europe-reach-european-agreement-development-skills-and-safeguarding-career-2021-06-08>, 8 June 2021.
 168 Pact for Skills for Aerospace and Defence, October 2020. Available at: <https://www.asd-europe.org/pact-for-skills-for-aerospace-and-defence>.
 169 ETF and IndustriAll Europe Workshop of 29 June 2023; and <http://www.leforem.be>.

BEST PRACTICE	DESCRIPTION	WHERE
AIRBUS Strategy ¹⁶³	AIRBUS is a leading company in the aviation sector, strongly focused on hiring young talents in the aviation industry; at the beginning of 2023, Airbus announced the opening of 13,000 workplaces for young, newly graduated people.	France
SCHIPHOL AIRPORT ¹⁶⁵	Strategy of increasing the salary of employees working in security, cleaning, ground handling (check-in, baggage) through airport-wide bargaining, and private bus transport to ensure a positive attractiveness of the sector.	Netherlands
PEARSON AIRPORT ¹⁶⁶	Pearson Airport in Toronto is investing in reskilling and upskilling the workforce thanks to a donation of 1.6 million dollars received from the Ontario Ministry of Labor Training and Skills Development.	Canada
SAFRAN AND IndustriAll EUROPE AGREEMENT ¹⁶⁷	Agreement that aims at developing and clarifying the skills needed in the aviation sector to safeguard careers and define training programmes for skills development and professional improvement of employees.	EU level
EU PACT FOR SKILLS AEROSPACE AND DEFENCE ¹⁶⁸	Creation of a Pact for Skills in Aerospace & Defence in close cooperation with universities and VET organisations, regional clusters and partnerships; aim to collectively ensure a continuous and sustainable supply of skills with equality and diversity for around 600,000 employees considering carbon neutrality, Industry 4.0, digital transformation, European Aerospace and Defence Programmes.	EU level
FOREM ¹⁶⁹	FOREM is a Public Company Adviser located in Wallonia, Brussels and Flanders, which aims to find jobseekers a working position in their industry of interest (including the aviation sector and aerospace industry) by collaborating with different stakeholders to reach the best results. FOREM also provides training tools for future workers necessary to match the companies' needs.	Belgium

Table 6: Best practices in the aviation and aerospace sector



D. THE ROAD SECTOR

1. The road sector in the framework of the EU decarbonisation strategy

The present study covers the sector's various transport modes – cars, light commercial vehicles and heavy-duty vehicles (HDVs), but with particular focus on HDVs (trucks, city and long-distance buses and coaches¹⁷⁰), as these are the common ground for action in the context of this joint project.

The sector is fundamental to the EU transport context: passenger cars' modal share in the EU was 87.2% in 2020, and the share for coaches, buses and trolleybuses ranged from 9.5% to 10.4% between 2010 and 2019. When it comes to freight transport, road transport's modal share reached 77.4% in 2020¹⁷¹. At the same time, transport sectors in general are responsible for about 25% of emissions at European level: 71% of these come from the road sector¹⁷². In order to reach climate neutrality, the EU is therefore pushing for stronger CO₂ standards towards the shift to other energy sources considered more environmentally sustainable, and designing policies that are aimed at promoting modal shift.

Concerning cars and light commercial vehicles, the main legislative steps taken at European level are part of the "Fit for 55" package. The latest proposal for a **revision of the Regulation 2019/631 (EU) "setting CO₂ emission performance standards for new passenger cars and for new light commercial vehicles"**¹⁷³ is particularly important in this regard, as it includes more ambitious objectives when it comes to

- a) reducing emissions of cars and vans by 2030 and 2050,
- b) increasing zero-emission vehicles and
- c) reinforcing the technological leadership of the EU manufacturers, by improving zero-emission technologies. The ultimate objective is to reach a 100% reduction of the CO₂ emissions of new passenger cars and new vans by 2035¹⁷⁴.

170. European Commission, *Questions and answers: revision of the CO₂ emission standards for Heavy-Duty Vehicles*, https://ec.europa.eu/commission/presscorner/detail/en/qanda_23_763, 14 February 2023.

171. Eurostat, *Key figures on European transport*, 2022 edition. Available at: <https://ec.europa.eu/eurostat/documents/15216629/15589759/KS-07-22-523-EN-N.pdf>.

172. European Environment Agency, *Transport and Environment report 2022, Digitalisation in the mobility system: challenges and opportunities*, May 2023. Available at: <https://www.eea.europa.eu/publications/transport-and-environment-report-2022/transport-and-environment-report>.

173. European Parliament, *Revision of CO₂ emission performance standards for cars and vans, as part of the European Green Deal*,

<https://www.europarl.europa.eu/legislative-train/package-fit-for-55/file-co2-emission-standards-for-cars-and-vans-post-euro6vi-emission-standards>, 20 April 2023.

174. Ibid.

Heavy-duty vehicles (HDVs) are responsible for more than 25% of GHG emissions from road transport in the EU and account for over 6% of total EU GHG emissions¹⁷⁵. At the beginning of 2023, the European Commission set the following objectives¹⁷⁶:

- ▶ For trucks: agreement to achieve a 45% reduction by 1 January 2030, a 65% reduction by 1 January 2035 and a 90% reduction by 2040. All these reductions must be implemented with respect to the 2019 emission level.
- ▶ For city buses: all new city buses will have to be zero emission by 2030.

When taking all road vehicles as a whole, the **Euro VII proposal**, announced on 10 November 2022 by the European Commission, replaces the Euro VI proposal, and is more ambitious in ensuring that all road vehicles substantially reduce their emissions. The Euro VII proposal covers all motor vehicles, but differentiates them in terms of the timing of the application of new standards: light-duty vehicles from 1 July 2025, HDVs from 2027 on the same day¹⁷⁷. The proposal will set out additional limits of particulate emissions generated by brakes, and also rules for microplastic production due to tyre wear. It is worth mentioning that, at this stage, discussions are still ongoing on some of the key points to be addressed and more will come in the next quarter of 2023.

As regards infrastructure, the **new Regulation for the deployment of alternative fuels infrastructure (AFIR)**¹⁷⁸, aims to ensure the rollout of a minimum number of electric recharging and hydrogen refuelling facilities. The following applies to cars and vans:

1. The infrastructure will have to be developed in order to install fast recharging stations of at least 150 kW every 60km along the trans-European transport (TEN-T) network¹⁷⁹.
2. Recharging stations dedicated to heavy-duty vehicles with a minimum output of 350 kW need to be deployed every 60km along the TEN-T core network, and every 100 km on the larger TEN-T comprehensive network from 2025 onwards, with complete network coverage to be achieved by 2030. In addition, recharging stations must be installed at safe and secure parking areas for overnight recharging as well as in urban nodes for delivery vehicles.

In April 2023, the European Parliament passed **ETS II**, to be launched in 2027. In the wake of ETS (the EU Emission Trading System), the European cap-and-trade system to reduce greenhouse gas emissions for industries in the European Union, a separate new ETS II was created for fuel used for road transport and buildings, putting a price on GHG emissions from these sectors in 2027 (or 2028 if energy prices are exceptionally high). Under ETS II:

- ▶ GHG emissions of ETS sectors must be cut by 62% by 2030 compared with 2005 levels;
- ▶ free allowances will be phased out from 2026 to 2034.

The 2022 revision of the **Eurovignette Directive** represents another significant landmark in the EU legislative framework, especially for transport workers. Under this revision, vignettes for heavy-duty vehicles (a form of road pricing imposed on vehicles, often levied in addition to compulsory road tax) will be phased out across the core trans-European transport network from 2030, and replaced by distance-based charges (tools). This Directive maintains the "polluter pays" principle, promoting a more sustainable road transport to comply with environmental requirements¹⁸⁰.

175. GHG: Greenhouse Gas; European Commission, *Questions and answers: revision of the CO₂ emission standards for Heavy-Duty Vehicles*, https://ec.europa.eu/commission/presscorner/detail/en/qanda_23_763, 14 February 2023.

176. Ibid.

177. European Commission, *Questions and Answers: Commission Proposal on the new Euro 7 standards*, https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_6496, 10 November 2022.

178. European Commission, *European Green Deal: ambitious new law agreed to deploy sufficient alternative fuels infrastructure*, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1867, 28 March 2023.

179. Ibid.

180. European Parliament Briefing, *Revision of the Eurovignette Directive*, 10 May 2022.

Available at: [https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2017\)614625](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2017)614625).

In addition, the **European Battery Regulation** discussed at the end of 2022 is a fundamental step towards a more sustainable road sector, covering electric vehicles as well as bikes and scooters, and in general every type of battery circulating in the EU. This Regulation is focused on promoting a circular economy, by regulating batteries throughout their whole life cycle, and setting minimum standards for their recycling¹⁸¹. The figure below shows the timeline of the European targets to ensure sustainability of the entire value chain over the long term¹⁸²:

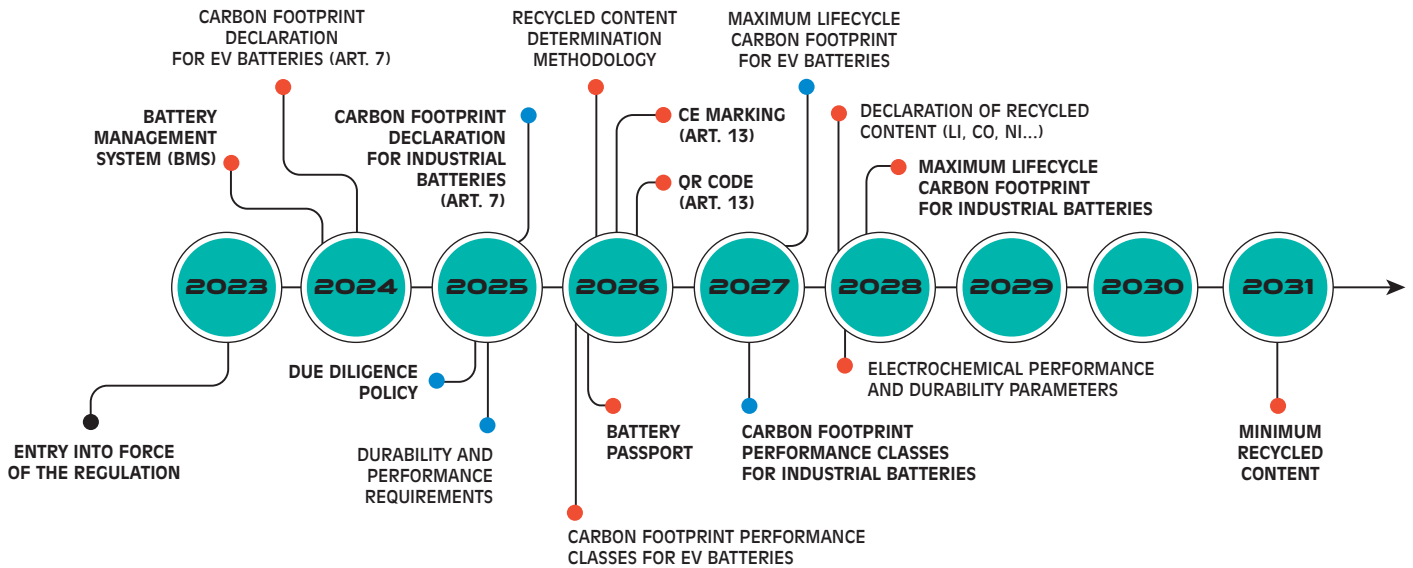


Figure 11: Agreement with a view to the new European Battery Regulation

The **Eco-design proposal** is another point worth mentioning, as it establishes (by 31 December 2023) minimum eco-design requirements for new passenger cars and light commercial vehicles when it comes to energy efficiency, electronic components and batteries; and minimum requirements for the recovery of metals, plastics and critical raw materials¹⁸⁴.

The Clean Vehicles Directive of 2019¹⁸⁵, is also a relevant measure for the evolution of road transport in the future. This Directive sets national targets for the procurement of “clean vehicles”¹⁸⁶.

The EU framework on road transport also touches on some significant changes in terms of urban mobility. Cities are expected to change dramatically in the next decades. To give some numbers, it is estimated that electric buses will have a growth rate of 16.4% between 2023 and 2028¹⁸⁷. In the context of the **Sustainable and Smart Mobility Strategy**¹⁸⁸, mobility in cities will be strongly impacted, provided that by 2030, 100 European cities will be climate neutral, requiring drastic measures for what concerns passenger transport, logistics and delivery services in the coming decades. Furthermore, automated mobility will be deployed on a large scale¹⁸⁹.

In this context, the **New European Urban Mobility Framework** stands out with a more ambitious approach to sustainable urban mobility planning and related indicators. This document firstly states some relevant facts, from which we can cite that:

- ▶ 23% of the EU's transport greenhouse gas emissions come from urban areas;
- ▶ 50 billion passengers were carried by buses, trams and metros in EU cities in 2018, saving 100 million car trips every day;
- ▶ 38% of road fatalities in the EU occur in urban areas, 70% of deaths are vulnerable road users;

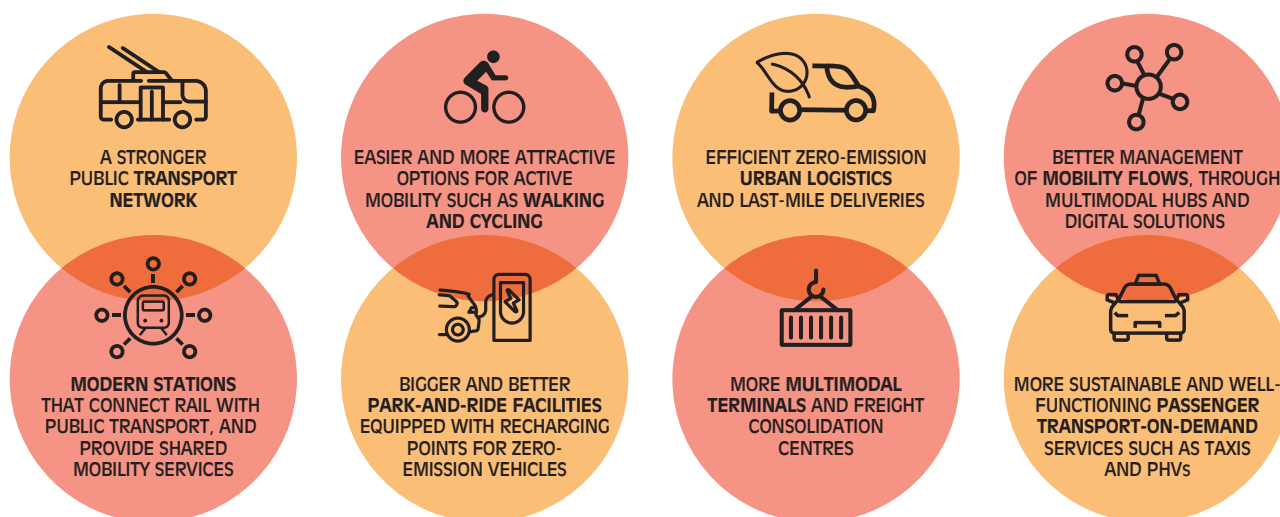


Figure 12: The new European Urban Mobility Framework¹⁹⁰

The new European Urban Mobility Framework defines a number of objectives that are represented in the above figure, all of which are relevant to making urban mobility more sustainable, smarter and healthier.

2. The road sector today and the pathway towards a Just Transition: focus on employment, skills and working conditions

Road means of transport still rely on particularly polluting fuels, such as oil and diesel, for the most part. They are responsible for a consistent part of air pollutants (being, for example, the principal source of nitrogen oxides in 2020, responsible for 37% of emissions¹⁹¹).

The electrification pathway will play a key (and probably unique) role in achieving climate targets. But the implications that this will bring in terms of employment, skills and the working conditions of workers is still to be fully analysed (e.g. the role of hydrogen: how to carefully assess its costs, efficiency and safety). The timing proposed at European level could seem over-optimistic: climate targets require massive workforce changes that will not be achieved in a short time span¹⁹².

181. European Council, *Council and Parliament strike provisional deal to create a sustainable life cycle for batteries*, <https://www.consilium.europa.eu/en/press/press-releases/2022/12/09/council-and-parliament-strike-provisional-deal-to-create-a-sustainable-life-cycle-for-batteries/>, 9 December 2022.

182. Flash Battery, *European Battery Regulation: A concrete step towards a sustainable future*, <https://www.flashbattery.tech/en/new-european-battery-regulation/>, 14 February 2023.

183. Ibid.

184. IndustriAll Europe, *Automotive sector in Europe towards a Just Transition?* Workshop Presentation of 1 February 2023.

185. Directive of the European Parliament and of the Council of 20 June 2019 amending Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles, 2019/1161. Available at: <https://eur-lex.europa.eu/eli/dir/2019/1161/oj>.

186. **Clean vehicles are defined as follows:**

1. Clean light-duty vehicles: Until 31 December 2025: vehicles with no more than 50g/km CO₂ and up to 80% of applicable real driving emission (RDE) limits for NOx and PN; from 1 January 2026: only zero-emission vehicles.

2. Clean heavy-duty vehicles: any truck or bus using one of the following alternative fuels: hydrogen, battery electric (including plug-in hybrids), natural gas (both CNG and LNG, including biomethane), liquid biofuels, synthetic and paraffinic fuels, LPG.

187. Impactful Insights, *Europe Electric Bus Market: Industry Trends, Share, Size, Growth, Opportunity and Forecast 2023-2028*, <https://www.imarcgroup.com/europe-electric-bus-market>, accessed 28 April 2023.

188. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 9 December 2020, *Sustainable and Smart mobility Strategy – putting European transport on track for the future*, COM(2020) 789 final, p. 8. The Strategy delineates the main steps to reach full decarbonisation and less dependence on fossil fuels at a European level.

189. Ibid.

190. European Commission Site, *THE NEW EUROPEAN Urban Mobility Framework*, https://ec.europa.eu/commission/presscorner/detail/en/fs_21_6781, 14 December 2021.

191. European Environment Agency, *Sources and emissions of air pollutants in Europe*, <https://www.eea.europa.eu/publications/air-quality-in-europe-2022/sources-and-emissions-of-air>.

192. Abnett K., *EU proposes 90% CO₂ emissions cut by 2040 for trucks*,

To give some examples, one of the main actions to achieve the ambitious European targets is to **install an adequate number of infrastructures** to charge the electric vehicles that will populate the roads by 2040¹⁹³. However, little focus has so far been put on the need to increase their number, especially since they are particularly expensive to install and maintain¹⁹⁴. As shown in the graphic below, featuring some relevant sample countries (referring to cars specifically), Spain and Finland have more electric cars than charging points to service them (as opposed to the Netherlands and Portugal).

ECV MARKET SHARE/CHARGING POINTS PER 100 km OF ROAD (BY COUNTRY, 2021)

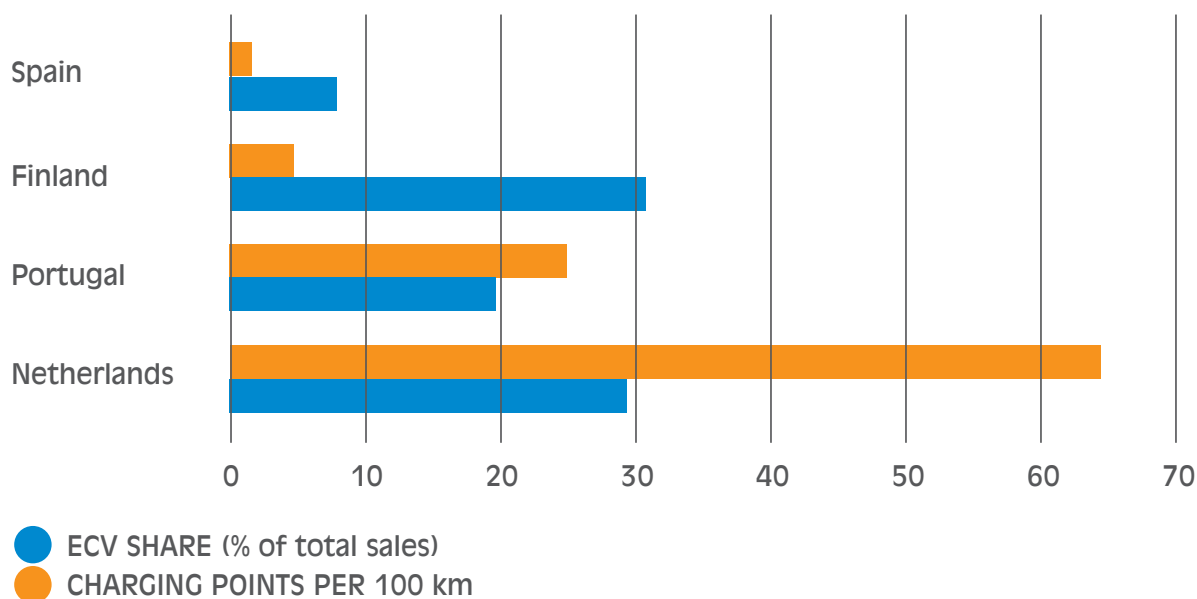


Figure 13: ECV market share/charging points per 100 km of road, own adaptation (by country, 2021)

In addition to the need to install an adequate number of charging points, the implementation of batteries also requires a **functional battery supply chain**, which should be enhanced, including the processing of battery chemicals and sourcing of raw materials. The latter are not sufficiently present in terms of quantity in the EU¹⁹⁶ and their procurement will not be immediate and simple, but they are crucial for the diversification of the supply chain¹⁹⁷. Trade-offs between chemical restrictions, circularity and sustainability are still to be solved.

The **rising power of China** should also be considered. While this country is a competitor for the EU and two thirds of companies are highly dependent on China (just under 40% of suppliers are evaluating all the potential risks of doing business in the country¹⁹⁸), this relationship can also lead to new, potentially positive investments (China is investing in Europe).

193. Ibid.

194. Cockelaere H., *It's 100 percent or bust for efforts to cut EU trucks emissions*, <https://www.politico.eu/article/eu-cut-truck-logistic-co2-emission-decarbonization/>, 13 February 2023; and ETF and IndustriAll Europe Workshop presentations, 27 April 2023.

195. ACEA, *Electric cars: 6 EU countries have less than 1 charger per 100km of road; 1 charger in 7 is fast*, <https://www.acea.auto/press-release/electric-cars-6-eu-countries-have-less-than-1-charger-per-100km-of-road-1-charger-in-7-is-fast/>, 2021.

196. CLEPA, *Net Zero Industry Act and State-aid Reform, May 2023*. Available at: <https://clepa.eu/mediaroom/clepa-calls-for-holistic-industrial-approach-to-the-manufacturing-of-clean-technologies/>.

197. CLEPA, *CLEPA's Materials Regulations and Sustainability event unites stakeholders to drive sustainability in the automotive supply industry*, <https://clepa.eu/mediaroom/clepa-materials-regulation-and-sustainability-event-unites-stakeholders-to-drive-sustainability-in-the-automotive-supply-industry/>, 26 May 2023.

198. CLEPA, *Automotive suppliers cautiously optimistic despite continuing pressure on profit margins*, <https://clepa.eu/mediaroom/automotive-suppliers-cautiously-optimistic-despite-continuing-pressure-on-profit-margins/>, 23 May 2023.

Mobility patterns are changing: it has been estimated that, in the future, the use of cars will probably decrease, as people are going to be less interested in owning their own vehicles. According to an IPSOS survey conducted in February 2023, one in three European car owners (32%) could consider not owning a personal car in the future¹⁹⁹. **Consumption patterns** are also changing: more online shopping is bringing a consequent increase and demand for accelerated delivery services – which in turn cause the emergence of new business models (such as platform work) and generating more precarious work.

And lastly, the modal shift from road to rail, urban public transport, as well as walking and cycling, is going to have an impact on the workforce of both manufacturing and transport. The European Commission, back in 2011, defined the target of shifting at least 30% of road freight transported further than 300 km to other means of transport, such as rail²⁰⁰. By 2050, the objective is to increase this to more than 50%. These ambitious targets were recently re-confirmed at European level²⁰¹.

All points considered, the above trends are going to deeply affect the road sector from different perspectives, especially the social one: the goal is to create a balance between social, industrial and climate needs in order to create a Just Transition for everyone.

The below figure summarises the main common trends currently taking place in the sector, as well as those that are affecting more specifically manufacturing and transport workers. More details on each area of employment, skills and working conditions are presented in the next paragraphs.

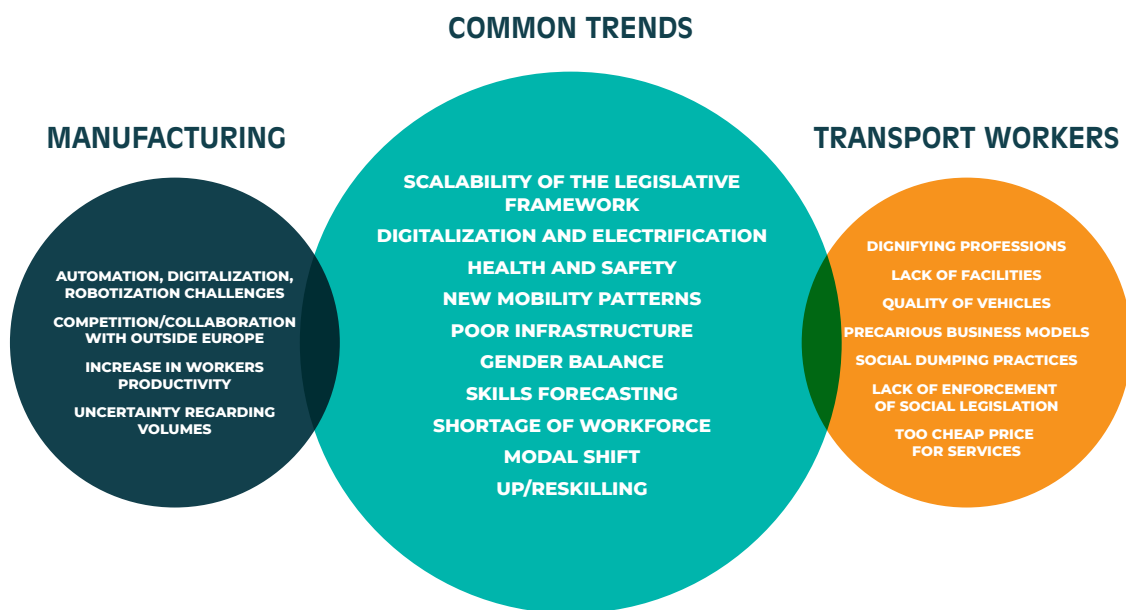


Figure 14: The road sector in the context of the digital and green transition: transport workers' and manufacturing perspectives

199. Ibid.

200. McKinsey & Company, *Bold moves to boost European rail freight*, <https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/bold-moves-to-boost-european-rail-freight>, 21 January 2022.

201. Ibid.

2.1 Employment

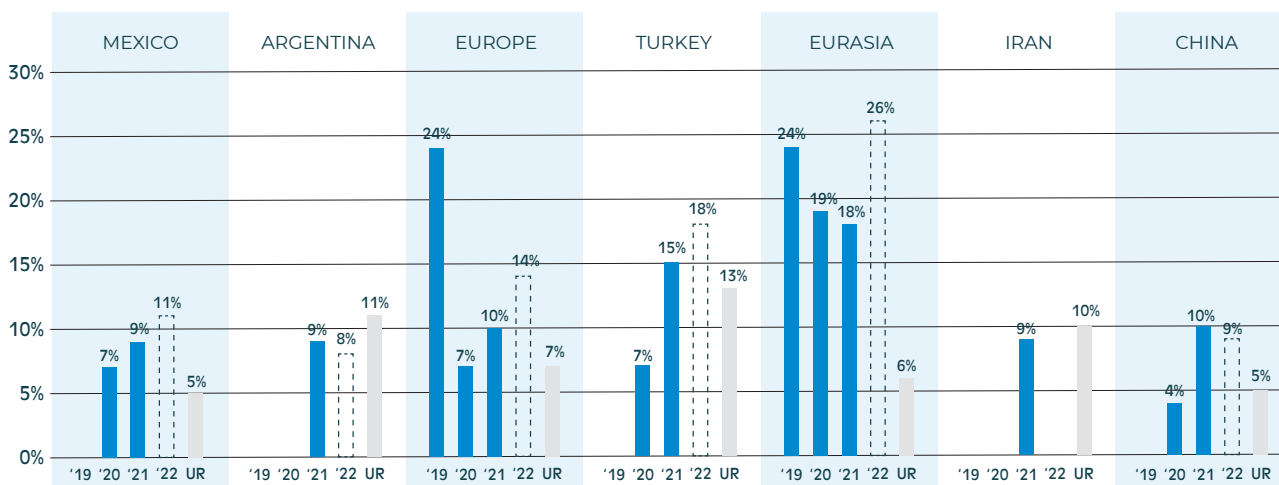
The current trends in this macro area are strongly interconnected with future development, affecting both manufacturing and transport workers.

Manufacturing is certainly going to suffer from the electrification, automation and robotisation processes: first of all, electric vehicles are much less labour intensive than traditional ones, requiring less labour²⁰². It has been predicted that about 100,000 job losses are expected in the manufacturing industry²⁰³ as electricity and alternative fuels become increasingly widespread, eventually covering 100% of the road market²⁰⁴. The digitalisation of the industry will also strongly impact sales and maintenance personnel, as operations will increasingly take place online, thus requiring fewer workers and consequently having an impact on future employment²⁰⁵. While many new jobs related to battery production, software development and charging-infrastructure operations will be created, it is less clear what compensation will be provided for the transition from the internal combustion engine to electric vehicles.

On the transport side, employment has already been impacted by the COVID-19 pandemic. According to the International Road Transport Union (IRU)²⁰⁶, this was particularly relevant for commercial road transport operators, but also for urban public transport, as they both suffered the sanitary and mobility restrictions established by governments. However, COVID-19 also accelerated and increased delivery services, while leading to new ways of working and business models, such as platform work.

With regard to truck and bus drivers, a shortage of workers has been going on for years, not only in Europe, but globally: according to the IRU, over 2.6 million truck driver jobs were unfilled worldwide in the regions surveyed by the organisation in 2021²⁰⁷.

TRUCK DRIVERS SHORTAGE CONTINUE TO GROW, MOVING BACK TO PRE-PANDEMIC LEVELS IN EUROPE AND EURASIA (% OF UNFILLED TRUCK POSITIONS 2019-2022(FC), UNEMPLOYMENT RATE (UR) 2020)



1. IRU SURVEY 2011, FC = FORECAST (FOR 2022),
 2. EUROSTAT (FOR EUROPE, EU 27 UNEMPLOYMENT) AND ILO 2020 (EXCEPT CHINA – URBAN UNEMPLOYMENT RATE 2021, CHINA'S NATIONAL BUREAU OF STATISTICS)

Figure 15: Truck driver shortages continue to grow, moving back to pre-pandemic levels in Europe and Eurasia²⁰⁸

202. IndustriAll Europe, *Automotive sector in Europe towards a Just Transition?*, JT4Mobility Workshop presentation of 1 February 2023.

203. Tamma P, *Will the Green Deal be a job drain?*, <https://www.politico.eu/article/green-deal-job-drain/>, 16 March 2022.

204. Ibid.

205. IndustriAll Europe, *Automotive sector in Europe towards a Just Transition?*, JT4Mobility Workshop presentation of 1 February 2023

206. Fulton L (ETF), *Automation and Digitalisation Toolkit*, report published on 23 March 2022, p. 43.

Available at: <https://www.etf-europe.org/resource/etf-automation-digitalisation-toolkit/>.

207. IRU Intelligence Briefing, *Driver Shortage Global Report 2022: Summary. Understanding the impact of driver shortages in the industry*, 2022.

Available at: <https://www.iru.org/system/files/IRU%20Global%20Driver%20Shortage%20Report%202022%20-%20Summary.pdf>.

208. IRU, *Global driver shortages: 2022 year in review*, <https://www.iru.org/news-resources/newsroom/global-driver-shortages-2022-year-review>, 22 December 2022.

Future automation of the sector will also influence the transport side, as many tasks carried out by workers have the possibility of being automated, putting their jobs at serious risk²⁰⁹.

While the recovery from the COVID-19 crisis is still happening, the future of the road sector in a digitalised and automated world is still uncertain and it will be particularly difficult to anticipate, especially because of the **prevalence of micro companies**. The consequences of the decarbonisation on micro companies are far more complicated to map²¹⁰, as is the **strong regional** dimension, which should be taken into account when it comes to different regional economies.

2.2 Skills

The progressive, required changes of the sector are already impacting the skills area, causing the need for a massive **up/reskilling process** which will need to be tackled, along with clear skills forecasting mechanisms both for manufacturing and transport.

With regard to manufacturing, the digital and green transformation in general will require a different set of skills compared to traditional engines: according to the Boston Consulting Group, the number of people who will need retraining due to the new requirements is estimated to be about 2.4 million²¹¹. The graphic below clearly represents the measures that will have to be considered when talking about up/reskilling for manufacturing in the same, similar or even completely new job profiles – measures ranging from on-the-job training to retraining, relocation and even requalification.

2.4M POSITIONS WITH DEDICATED TRAINING NEEDS

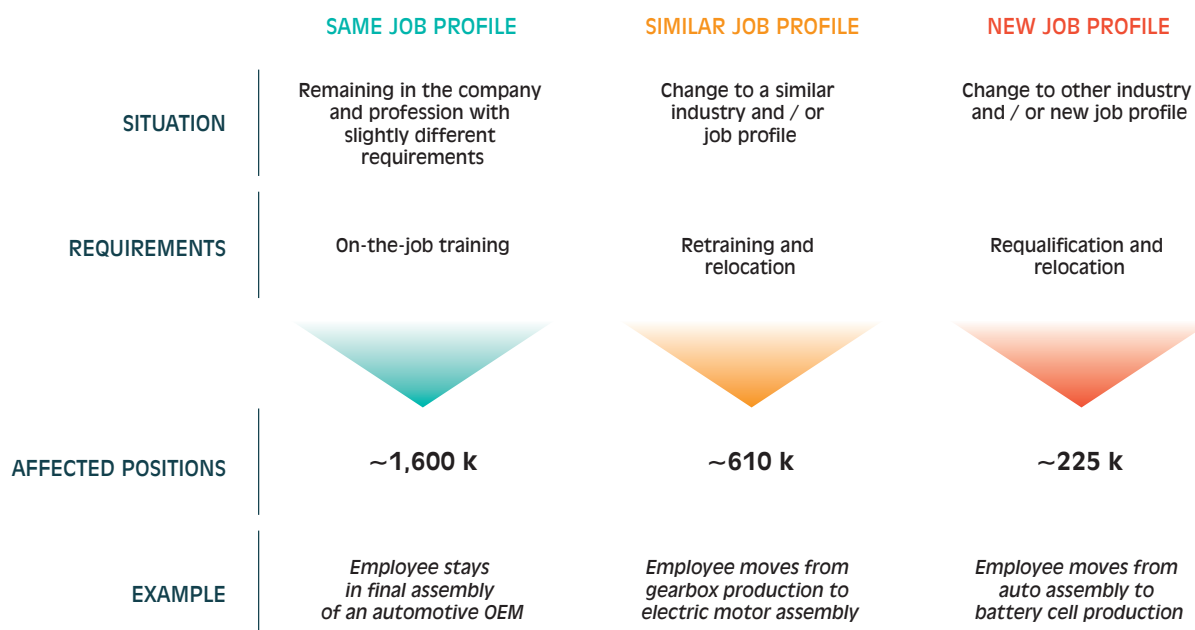


Figure 16: 2.4M positions with dedicated training needs

209. ETF and IndustriAll Europe JT4Mobility Workshop presentations of 1 February 2023; and Fulton L. (ETF), *Automation and Digitalisation Toolkit*, report published on 23 March 2022, p. 12.

210. ETF and IndustriAll Europe JT4Mobility Workshop presentations of 1 February 2023.

211. Boston Consulting Group, *Is E-mobility a Green Boost for European Automotive Jobs?* Available at: <https://web-assets.bcg.com/82/0a/17e745504e46b5981b74fadba825/is-e-mobility-a-green-boost.pdf>.

According to the Automotive Skills Alliance (ASA) part of the Pact for Skills, launched in 2020, environmental and digital trends were already impacting around 15 million Europeans in the industry as of that year, due to both COVID-19 and new European environmental requirements. The demand for a **higher level of education and training** is particularly striking when it comes to engineers, software developers and sourcing experts. It has been reported by Cedefop that medium-skilled technical jobs (metalworkers, electro-engineering workers) are decreasing, while highly skilled technical jobs (researchers, engineers, ICT professionals) are increasing.²¹³

The road transport side (especially bus and truck drivers) is already suffering from skills shortages in general²¹⁴, along with a lack of recognition of the profession as a skilled job in many EU countries. In this context, the digital and green transition and the necessity to get trained can play a strategic role in **dignifying the profession** and give more professional recognition. But, as new skills become increasingly vital, it is important to emphasise that not every worker can have access to training in the same way: an inclusive approach is even more necessary here.

Finally, tackling modal shift from road to rail and urban public transport will also require coordinated action to **assess the transferability of skills** and eventually **establish proper training and specific educational plans**; all this without undermining the wellness and the freedom of choice of workers.

2.3 Working conditions

Working conditions will very much have to be taken into consideration when talking about a shift from the traditional engines to different, more sustainable solutions, such as electricity, hydrogen and batteries. Technological advances can represent both an opportunity and a challenge, as they can improve the work environment, but also bring about new hazards and exacerbate emerging occupational safety and health (OSH) risks²¹⁵.

Regarding manufacturing, an **intensification in workers' productivity** due to electrification and digitalisation is already happening and will grow in the future. The increase in required worker efficiency is mostly due to the large investments made by companies in the industry to adapt to the new European environmental requirements, which will consequently affect the salary of employees as well as the length of their shifts²¹⁶. Another point worth mentioning is related to the many dangers that handling new fuels may bring. In 2014, Eurofound published a comprehensive report²¹⁷ on the metal industry regarding working conditions and job quality. While the study is extremely useful for road transport, no recent updates were given in terms of robust quantitative information to properly tackle the issue of working conditions.

For road transport workers, working conditions – in particular in freight transport – are already quite worrying. Truck drivers are penalised by **long working shifts** that result in extended driving hours²¹⁸, **precarious work** generated by new, required business models, but also a **lack of facilities**, such as bathrooms and showers in parking lots²¹⁹. **Social dumping** practices can also be evidenced, together with a **lack of enforcement of social legislation. Women are even more penalised**, as they may have additional needs to men, thus suffering even more from the shortage of adequate space for washing themselves and changing²²⁰. Also, women are much less included in the HDVs sector: in 2021 in Europe, less than 3% of women were involved in truck driving, while for bus and coach driving, the percentage dropped from 16% in 2020 to 12% in 2021²²¹.

The **impact of the use of batteries** has to be considered as well. Risks when handling batteries are greater than in the case of combustion engines²²², as they have different hazard levels that could result in explosions, endangering both drivers' and manufacturing workers' lives. Batteries are not safe until the energy contained in them is totally removed. When energy is still present, different hazard levels can occur due to incorrect handling of the battery itself, causing various possible consequences, ranging from the least dangerous – with no consequences for the workers' health – to a potentially lethal situation²²³. The graphic below shows the various hazard levels that can happen when batteries are not properly handled, ranging from the least dangerous (green bar) to potentially lethal (red bar):

ACCORDING TO EUCAR

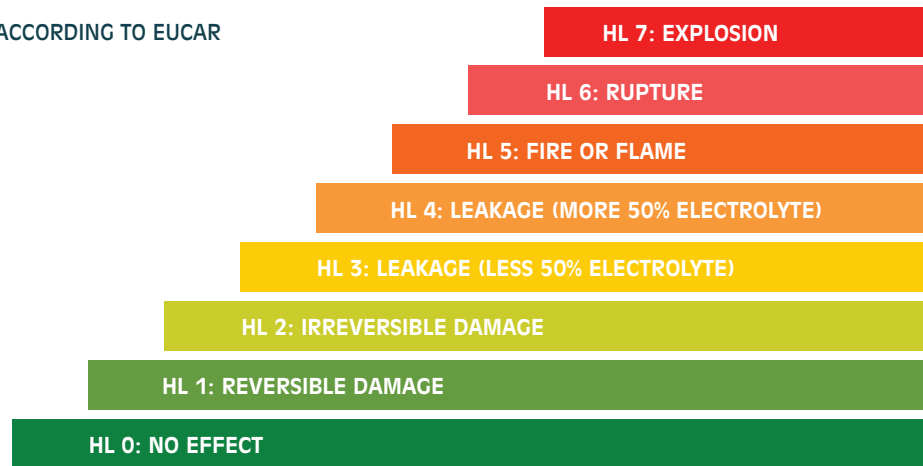


Figure 17: What can happen: hazard levels²²⁴

It is evident that new technologies are potentially going to pose a number of risks to the health and safety of workers in both manufacturing and transport. A key step here is finding the best trade-off between the most efficient and climate-neutral technology and the least harmful for workers: this is in order to ensure that the decarbonisation pathway does not become a double-edged sword that undermines the social dimension of sustainability. It is vital to ensure that the environmental and social concerns do not run in parallel but complement each other.

212. The Pact for Skills, *Skills Partnership for the Automotive Ecosystem (Summary)*, proposal launched by the Automotive Skills Alliance, 10 November 2020.

213. Cedefop, *Automotive industry at a crossroads*, https://www.cedefop.europa.eu/en/data-insights/automotive-industry-crossroads#_automotive_jobs_and_skills, 17 February 2021

214. IRU, *Mobilise European Year of Skills in driver shortage fight*, <https://www.iru.org/news-resources/newsroom/mobilise-european-year-skills-driver-shortage-fight>, 10 May 2023.

215. ILO, *The future of work in the automotive industry: The need to invest in people's capabilities and decent and sustainable work*, https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/meetingdocument/wcms_741659.pdf, 2020.

216. IndustriAll Europe, *Automotive sector in Europe towards a Just Transition?*, workshop presentation of 1 February 2023; and Interview with IndustriAll Europe members, November 2022.

217. Eurofound, *Metal industry: Working conditions and job quality, 2014*.

Available at: <https://www.eurofound.europa.eu/publications/information-sheet/2014/working-conditions/metal-industry-working-conditions-and-job-quality>.

218. ETF and IndustriAll Europe JT4Mobility Workshop presentations of 1 February 2023.

219. ETF and IndustriAll Europe JT4Mobility Workshop presentations of 27 April 2023.

220. Ibid.

221. IRU Intelligence Briefing, *Driver Shortage Global Report 2022: Summary. Understanding the impact of driver shortages in the industry, 2022*.

222. ETF and IndustriAll Europe JT4Mobility Workshop presentation of 26 April 2023.

223. ALBATTIS Workshop, *Safe Recycling & Second Use of EV Batteries: Skills and Competences Needed, 27 January 2023*.

224. Ibid.

3. The way forward: main common opportunities, challenges and best practices

The road sector will face different challenges to comply with the future decarbonisation objectives. The sector is already suffering from some specific issues, strongly related to poor working conditions for what concerns transport workers. On the manufacturing side, progressive digitalisation, automation and electrification represent opportunities, but also challenges to current jobs, skills and working conditions. Active and meaningful social dialogue at all levels will play a key role towards a successful transition to a more sustainable sector, to guarantee social sustainability at the same time.

At European level, a Sectoral Social Dialogue Committee (SSDC) exists for the road transport sector, covering passenger transport by road, freight transport by road and urban public transport²²⁵. The social partner on the workers' side is the European Transport Workers' Federation (ETF). On the employers' side, the social partners are the International Road Transport Union (IRU) and the International Association of Public Transport (UITP). The European sectoral social dialogue for Urban Public Transport is formally a working group of the SSDC for road transport with the ETF and UITP as the main employer association.

On the manufacturing side, European social dialogue related to the automotive industry is hosted by the Social Dialogue Committee for the Metal, Engineering and Technology-Based Industries (SD MET) where the social partners are IndustriAll European Trade Union on the workers' side, and Ceemet, the European employers' organisation representing the interests of the Metal, Engineering and Technology-based industries, for the employers²²⁶. This allows for joint initiatives about the automotive industry, such as letters to EU institutions or campaigns²²⁷. European Works Councils for multinational companies are also providing a space where trade unions can discuss the transition with employers. In 2022, IndustriAll Europe issued guidelines to support workers' representatives in EWCs (or other negotiating bodies) about the role they can play in fostering dialogue about decarbonisation in their multinational companies.

In this scenario, the added value of this study is to delineate **common opportunities and challenges between the two areas with a specific focus on heavy-duty vehicles**, so as to address them with a shared approach. Open points to be tackled include:

AT POLICY LEVEL:

- ▶ Demanding **more consistency at European level and harmonisation of sustainability policies** and initiatives, to streamline the sector's efforts to manage the transition carefully to allow anticipation of what is to come.
- ▶ Relying on the support of trade unions in **anticipating the main challenges and repercussions at social level**.
- ▶ Evaluating **open strategic autonomy** and **diversification of the supply chain** with regard to sustainable energies as well as critical raw materials.
- ▶ **Implementing charging and safer infrastructure** in the EU to meet the requirements of e-mobility.
- ▶ **Encouraging negotiations** to agree on plans and strategies to achieve a Just Transition at company level.
- ▶ **Evaluating other technologies complementary to electrification**. Other carbon-neutral fuels can be explored, taking into account their limitations.

AT EMPLOYMENT AND SKILLS LEVEL:

- ▶ Taking into consideration the **future job opportunities in research and development departments**, as they become more prominent with the progressive digitalisation of the sector.
- ▶ **Preparing workers to face the transition**, and for this reason, **lifelong learning shall be implemented by companies** and supported by national and regional authorities.
- ▶ **The need for more planning for future skills**: identifying the risks that may emerge with the use of new fuels and assessing accordingly the future skills requested.
- ▶ The need for **higher education/training**.

AT WORKING CONDITIONS LEVEL:

- ▶ **Considering a reduction in working hours**, while at the same time preventing all the possible negative impacts on drivers (e.g. more work-related stress in order to meet delivery targets). New technologies and patterns of mobility may facilitate a reduction of the burden on drivers, especially with the shift to greener modes and combined transport. However, time spent charging zero-emission vehicles should be considered to be working time, and charging should not occur during a driver's breaks or when taking rest time in the vehicle.
- ▶ **Workers' safety should always be put first**: training is needed to manage new fuels and new resources without putting employees' health at risk.
- ▶ **Equipping parking lots with the facilities** that bus, coach and truck drivers need.
- ▶ **Guaranteeing social protection and preserving good working conditions** in case of job transitions (as a result of the modal shift).

225. European Commission, *Employment, Social Affairs and Inclusion*, <https://ec.europa.eu/social/home.jsp>, accessed 5 July 2023.

226. IndustriAll Europe, SD Metal, Engineering and Technology-Based Industries (MET). Available at: <https://news.industrial-europe.eu/p/sd-met>.

227. See, for instance,

https://news.industrial-europe.eu/documents/upload/2020/5/637260897392106073_Press_Release_EN_ACEA_CLEPA_IAE_recovery%20plan_final.pdf, or
https://news.industrial-europe.eu/documents/upload/2021/7/637612507887371409_Letter%20to%20Mr%20F%20Timmermans%20-%20Urgent%20need%20for%20a%20Just%20Transition%20framework%20for%20Europe's%20automotive%20workforce.pdf.

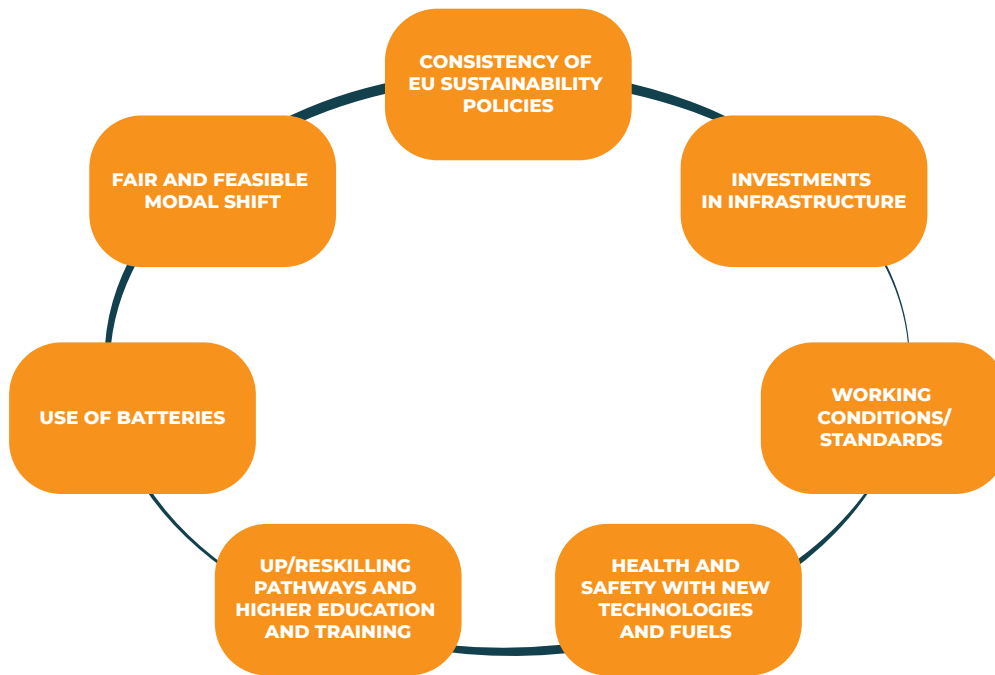


Figure 18: Ensuring a Just Transition for the road sector: main common action points

There are already some **best practices** and studies conducted at EU, extra-EU and national level which should be considered, as their application and replication can be extremely useful in ensuring the fairest possible harmonisation of the transition. The table below gives some examples:

BEST PRACTICE	DESCRIPTION	WHERE
Greenetra ²²⁸	Greenetra offers hybrid and flexible courses in order to train battery enthusiasts and workers to deal with li-ion battery technology (including safety, testing of li-ion batteries, fundamentals of electrical engineering, and fundamentals of electro chemistry).	International level
EU Battery Academy ²²⁹	The European Battery Alliance Academy aims at training, reskilling and upskilling approximately 800,000 workers by 2025 to meet the demands of the skills shortages in the rapidly growing European battery value chain.	EU level
Automotive Skills Alliance ²³⁰	The Automotive Skills Alliance aims at putting in place an up/reskilling framework to maximise the competitiveness of the industry, job retention and job opportunities. The plan is to present a roadmap for the transformation of skills in order to achieve a full recovery of the industry from the COVID-19 pandemic, and to meet future requirements towards greater eco-sustainability. The aim is to upskill and reskill 5% of the workforce each year.	EU level

BEST PRACTICE	DESCRIPTION	WHERE
UK Hydrogen Strategy ²³¹	Report compiled by the UK Government to boost the prospects of implementing hydrogen in the transport industry, involving both the development of a specific action plan running from the 2020s to the 2030s with a view to facilitating the transition towards the integration of hydrogen, and collaboration with various stakeholders in order to assess future skill needs.	United Kingdom
ALBATTs Project ²³²	EU-funded project with the aim of contributing to the electrification of transport and green energy in Europe. The aim is to design a blueprint for competences and training schemes of the future, bringing together the supply and demand of the battery sector.	EU level
IRU Academy ²³³	The IRU Academy Safe Loading and Cargo Securing course is based on the International Guidelines for Safe Load Securing for Road Transport, which incorporate the latest international standards. Anyone involved in the loading and securing of cargo, including transport operators, commercial drivers, loaders, customers and suppliers, can participate in the classes, using interactive tools to simulate certain situations.	International level
Scania ²³⁴	Scania is a world-leading provider of transport solutions, including trucks and buses for heavy transport applications. Scania is committed to finding the skills of the future in STEM (Science, Technology, Engineering and Mathematics). Scania is also committed to involving young people in STEM and developing the skills of existing employees in their group.	International level

Table 7: Best practices in the road sector

228. Greenetra, *Our Courses*, <https://greenetra.com/our-courses/>, accessed 3 May 2023.

229. European Institute of Innovation & Technology Site, *Launching the European Battery Academy to Reskill Thousands of Industry Workers*, <https://eit.europa.eu/news-events/news/launching-european-battery-academy-reskill-thousands-industry-workers>, 24 February 2022.

230. ASA, *A Skills Partnership for the Automotive Ecosystem*, https://automotive-skills-alliance.eu/pact_for_skills/, accessed 29 May 2023; and The Pact for Skills, Skills Partnership for the Automotive Ecosystem [Summary].

231. UK Government, *UK Hydrogen Strategy*, August 2021. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1011283/UK-Hydrogen-Strategy_web.pdf.

232. ALBATTs, *About ALBATTs*, <https://www.project-albatts.eu/en/aboutus>, accessed 29 May 2023.

233. IRU Academy, *Safe Loading and Cargo Securing*, 2017. Available at: https://www.iru.org/system/files/IRU_Academy_Factsheet_Safe_Loading_web.pdf.

234. Scania, *Education & Skills*, <https://www.scania.com/group/en/home/about-scania/sponsorship-and-community-engagement/education-and-skills.html>, accessed 31 May 2023.



E. THE RAILWAY SECTOR

1. The railway sector in the framework of the EU decarbonisation strategy

Rail has a key role in the decarbonisation pathway of the mobility ecosystem. Considered as the greenest mode of transportation for both passengers and goods, it is responsible for only 0.4% of transport related greenhouse gas emissions²³⁵, and is therefore currently at the forefront of the political scenario, which sees and aims at a future “rail renaissance”.

However, having such a strategic role means that it is under the attention of the EU and its ambitious goals to achieve climate neutrality. Most recent EU regulations are in fact setting numerous targets and objectives to rapidly shift to rail, and many initiatives are being promoted to enhance the whole system.

While all these mechanisms at policy level are extremely important to decarbonise the mobility ecosystem, the question is whether a balance between what is required in terms of regulations and what can be actually delivered can be ensured. The manufacturing side of railway may not yet be fully prepared/equipped with the right tools to produce (e.g. chemical supply), and railway workers may have difficulties in keeping up with the demand. There are also challenges when it comes to ensuring good jobs and decent working conditions: an adequate regulatory environment that embraces a conscious modal shift is therefore required. The risk of “over-regulation” should be avoided, as well as the promotion of transversal general initiatives that do not take the specificities of the railway sector into consideration.

When referring to the main policies that involve the railway sector, already in 2011 the **European White Paper on Transport** laid a first foundation towards the progressive shift to rail, stating that²³⁶:

- ▶ 30% of road freight over 300 km should shift to other modes of transport, such as rail, by 2030, and more than 50% by 2050.
- ▶ By 2050, there should be a complete European high-speed rail network.
- ▶ By 2050, there should be a connection to rail freight and inland waterway systems.
- ▶ A fully functional and EU-wide multimodal TEN-T “core network” should be implemented by 2030, with a high-quality capacity network by 2050 and a corresponding set of information services.

The progressive awareness gained, thanks to the **Green Deal**, considered rail as the top priority towards climate-friendly transport. The Ministerial Conference of **European transport ministers in 2020** set out an approach for rail from an environmental perspective, by²³⁸:

- ▶ recognising the Green Deal initiative and considering it fundamental in delivering sustainable and carbon-free rail transport;
- ▶ supporting railway projects in the period 2021-2027;
- ▶ encouraging intermodal cooperation with road and waterborne transport to provide efficient transport chains in the most eco-friendly way.

At the end of 2020, **the Sustainable and Smart Mobility Strategy** set (and reiterated) the importance of enhancing the railway system, establishing that²³⁹:

- ▶ by 2030, high-speed rail traffic will double;
- ▶ by 2050, rail freight traffic will double, and high-speed rail traffic will triple.

Additionally, the year 2021 was declared the **'European Year of Rail'**, promoting how trains can be a valuable tool to reach climate-neutrality by 2050²⁴⁰. This initiative aimed to show how rail is the only mode of transport able to reduce emissions while achieving economic growth, increasing electrification of the railway, and raising awareness of the importance of the modal shift from other more polluting ways of transport²⁴².

In addition, **Europe's Rail Joint Undertaking (EU-Rail)** was established by a Council Regulation (EU) at the end of 2021. Put in place under the Horizon Europe programme (2020-2027), EU-Rail represents a new European partnership on rail research and innovation²⁴³ aimed at:

- ▶ eliminating barriers to interoperability and providing solutions for full integration by covering traffic management, vehicles, infrastructure and services;
- ▶ reducing overall lifecycle costs, increasing capacity and enhancing flexibility and reliability;
- ▶ ensuring a fair transition towards a more attractive, easy to maintain, efficient and sustainable European railway system.

As underlined by the European Parliament as part of the **National Recovery and Resilience Plans**, investment in rail is mentioned in 21 plans²⁴⁴. Beyond the general upgrades, electrification of specific rail sections, digitalisation, new rolling stock and building missing links are top priorities.

235. Global Railway Review, *The key role of alternative fuels in the decarbonisation of Europe's rail sector*, <https://www.globalrailwayreview.com/article/132700/alternative-fuels-decarbonisation-europe-rail-sector/>, 5 April 2022.

236. European Commission, *White Paper on Transport*, Publications Office of the European Union, Luxembourg, 2011, p. 10. Available at: https://transport.ec.europa.eu/system/files/2016-09/white-paper-illustrated-brochure_en.pdf.

237. Ministerial Declaration, *Rail Freight Corridors: The Future of Rail Freight in Europe*. Ministerial Conference "Innovative Rail Transport – connecting, sustainable and digital", Brussels, 21 September 2020, p. 2. Available at: https://bmdv.bund.de/SharedDocs/EN/Documents/K/innovative-rail-transport-21-09-2020.pdf?__blob=publicationFile.

238. *Ibid.*, p. 6.

239. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 9 December 2020, *Sustainable and Smart Mobility Strategy – putting European transport on track for the future*, COM(2020) 789 final, pp. 2-3.

240. European Commission, *End of the European Year of Rail – beginning of a new journey*, https://transport.ec.europa.eu/news-events/news/end-european-year-rail-beginning-new-journey-2022-02-21_en, 21 February 2021.

241. Rail Freight Forward, 2021 – *The European Year of Rail*, <https://www.railfreightforward.eu/node/70>, 2021.

242. *Ibid.*

243. Europe's Rail, *About Europe's Rail*, <https://rail-research.europa.eu/about-europes-rail/>, 2021.

244. European Parliament, *Transport trends in national recovery and resilience plans*. Available at: [https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698765/EPRS_BRI\(2021\)698765_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698765/EPRS_BRI(2021)698765_EN.pdf).

The countries mentioned are Belgium, Bulgaria, Czechia, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Latvia, Hungary, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland and Sweden.

But besides being considered as the greenest mode of transport, changes towards a more sustainable railway sector that includes alternative fuel solutions, along with electrification, are also expected and encouraged²⁴⁵. However, rail supply was not explicitly included in the scope of the European Commission's recent **Net-Zero Industry Act**. It was finally given a more prominent role in the 2021 European Union **Alternative Fuels Infrastructure Regulation (AFIR)**²⁴⁶ after negotiations were held in May 2023. The new agreement defines the following objectives²⁴⁷:

- ▶ Member States shall assess the development of alternative fuel technologies and propulsion systems for rail sections that cannot be fully electrified for technical and cost-efficiency reasons.
- ▶ By 2025, Member States will have to provide an overview of the state of play, perspective and planned initiatives for hydrogen or battery electric trains on parts of the network that cannot be electrified.

The EU agenda for rail is both important and ambitious. The present study analyses the potential impacts of the green/digital transition on its workforce (rail manufacturing and railway workers), to **pinpoint the main common opportunities and challenges** in order to achieve both environmental and social sustainability objectives.

2. The railway sector today and the pathway towards a Just Transition: focus on employment, skills and working conditions

According to UNIFE²⁴⁸, rail will experience an average annual growth rate of 3.0% by 2027 worldwide²⁴⁹, reaching a global market volume of 211 billion euros between 2025 and 2027. From a high-level perspective, the question is **how such numbers can be fully achieved while ensuring a smooth transition for the current and future rail workforce**, which is going to experience major changes in terms of employment, skills and working conditions.

First, if the objective is to give the railway sector the strategic role it deserves for the green transition of transport, a focus on **infrastructure** is key²⁵⁰. According to the most recent statistics of the European Commission²⁵¹ (2020) the total length of the railway lines in use in the European Union was 200,099 kilometres, while this was 199,587 in 2019, 199,741 in 2015 and 204,149 in 2010.

A clear action plan on public investments in infrastructure is currently only partially addressed, and the impact of the most recent financial crisis and austerity policies, together with the COVID-19 pandemic, have further slowed down state aid to renovate infrastructure.

A proper digitalisation of infrastructure and the development of new vehicles and new strategies²⁵² can be considered, so as to build a fully connected technology stack that is digitally controllable at every point – from the signals and switches on the line to digital automated couplings (DAC)²⁵³. Some enablers in this sense are the **European Rail Traffic Management System/European Train Control System (ERTMS/ETCS)**²⁵⁴, which has the function to replace countries' legacy control by establishing a common European standard and enabling interoperability and economies of scale, calculating a maximum speed for each train with the help of on-board systems²⁵⁵; the **Digital Automated Coupling (DAC)** to automatically couple and decouple the rolling stock; and the **Automatic Train Operation (ATO)**, a technology that enables the automation of the train, already spread among metros around the world²⁵⁶.

It is therefore necessary to **emphasise the need for investments**: according to UNIFE, the investments needed are estimated to be about 430 billion euros by 2030²⁵⁷. This applies to rolling stock, but also to boost and improve the rail network towards innovative and climate friendly technologies.

Another connected aspect is linked to the **electrification of rail**. According to a Global Railway Review article published in 2022, only 54% of the rail network is electrified, while the rest still relies on diesel²⁵⁸: this brought and still brings about the need to find alternative fuel solutions that will be key to make the railway sector indispensable in the European transport landscape. Some examples of alternative fuels that could help reduce the industry's emissions are hydrogen fuel cell technology (FCH), as well as battery-powered traction

solutions²⁵⁹. According to a study conducted by Shift2Rail, hydrogen could in fact be a key fuel to decarbonise the sector, as the FCH technology can compete on an equal footing with diesel in the railway sector, even surpassing the potential of battery use in this area²⁶⁰. However, rail manufacturing is currently suffering from the lack of a clear rail industrial policy in order to boost the supply chain, especially when it comes to R&D, raw materials' supply, and on a more global level, the risk of delocalisation given the price increase of materials.

In addition, the encouraged modal shift from the most polluting sectors (such as road) to rail might not be easy to implement. The main issue is related to the **difficulty in guaranteeing a time of delivery** in the case of freight rail transport (compared to road freight)²⁶¹. And when considering the perspective of workers in comparison with other sectors, it can be evidenced that **there is rarely a level playing field** in terms of labour costs and (internalised) environmental costs.

There is also the need to reflect on the EU **liberalisation policies** with respect to rail and the new strategic role that is planned for it. The intensified competition as a result of liberalisation has worsened the current working conditions of railway workers: there is an increasingly fine line between promoting the railway sector versus promoting competition between the various actors involved.

Strategies of large railway and rail supply companies and their relations with third countries shall also be looked at when talking about fair competition. Some companies have done business in third countries for many years, and major investments are being made in building joint ventures, enterprises and providing service solutions and development activities²⁶². While having their roots in the EU and guaranteed support from EU Member States, a potential risk is that of increasing the **competition for investments** between EU sites and third-country locations, e.g. in China or India. Another detrimental factor from the perspective of the supply chain is a general **low-cost of supply**, which puts EU sites under severe pressure, including increased competition at EU level, or even closure of EU sites and the necessity to shift production or services (R&D) to other third-country sites. It is evident that the European industry should address this challenge to ensure that the conditions are open to achieve fair economic relations, and that there are no negative repercussions on workers.

245. For more details on alternative fuel solutions, please see the section entitled "The railway sector today and the pathway towards a Just Transition: focus on employment, skills and working conditions".

246. Regulation of the European Parliament and of the Council of 14 July 2021 on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council, 2021/0223.

247. UNIFE, *Press Release: UNIFE and CER welcome the conclusion of the negotiations on the Alternative Fuels Infrastructure Regulation*, <https://www.unife.org/news/press-release-unife-and-cer-welcome-the-conclusion-of-the-negotiations-on-the-alternative-fuels-infrastructure-regulation/>, 24 May 2023.

248. UNIFE (European Rail Supply Industry), *Global Rail Supply Industry resurgent despite crises*, <https://www.unife.org/news/global-rail-supply-industry-resurgent-despite-crises/>, 20 September 2022.

249. While this is not an EU-level forecast, it is fundamental to an understanding of how rail is going to develop in the years ahead.

250. McKinsey & Company, *Bold moves to boost the European rail freight*, January 2022.

Available at: <https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/bold-moves-to-boost-european-rail-freight#/>.

251. European Commission, Directorate-General for Mobility and Transport, *EU transport in figures: statistical pocketbook 2022*, Publications Office of the European Union, Luxembourg 2022, <https://data.europa.eu/doi/10.2832/216553>.

252. Ibid.

253. Strategy & (part of the PwC network), *Back on track: Solving the digitization challenge for Europe's rail sector*, 2022, <https://www.strategyand.pwc.com/de/en/industries/transport/railway-digitization/strategyand-railway-digitization.pdf>, p. 3.

254. Ibid.

255. Ibid.; and Thales, *European Train Control System (ETCS): Technology*, <https://www.thalesgroup.com/en/markets/transport/signalling/signalling-solutions-main-line-rail/european-train-control-system-etcs>, accessed 6 June 2023.

256. Ibid.; and RailEngineer, *ATO- Exploiting the Technology*, <https://www.railengineer.co.uk/ato-exploiting-the-technology/>, accessed 6 June 2023.

257. UNIFE, *EU funding and financing for rail projects in the 2021-2027 Multiannual Financial Framework*, September 2018, p. 3. Available at: <https://www.unife.org/wp-content/uploads/2021/03/EU-funding-and-financing-for-rail-projects-in-the-2021-2027.pdf>.

258. Global Railway Review, *The key role of alternative fuels in the decarbonisation of Europe's rail sector*, <https://www.globalrailwayreview.com/article/132700/alternative-fuels-decarbonisation-europe-rail-sector/>, 5 April 2022.

259. Ibid.

260. Shift2Rail, *Study on the Use of Fuel Cells and Hydrogen in the Railway Environment*, April 2019. Available at: https://rail-research.europa.eu/wp-content/uploads/2019/05/Study-on-the-use-of-fuel-cells-and-hydrogen-in-the-railway-environment_final.pdf.

261. Kmet J. (Slovak Ministry of Transport), *Shifting freight transport from road to rail*, 8 April 2021.

Available at: https://www.linkedin.com/pulse/shifting-freight-transport-from-road-rail-jaroslav-kme%C5%A5/?trk=portfolio_article-card_title.

262. Examples are Alstom, which has had a presence in China for almost 60 years (see <https://www.alstom.com/alstom-china>) and Siemens, which has been in China for over a century (see <https://www.siemens.com/cn/en/company/about/siemens-in-china.html>).

The diagram below summarises the main common trends currently taking place in the railway sector, as well as those that are affecting more specifically rail manufacturing and railway workers. More details on each area of employment, skills and working conditions are presented in the next paragraphs.

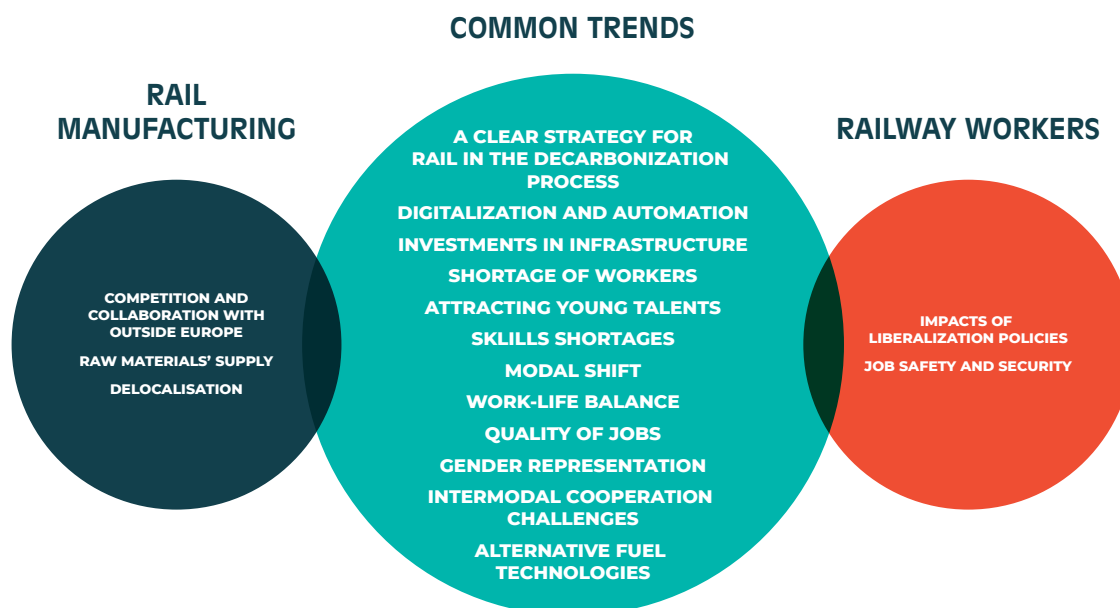


Figure 19: The railway sector in the context of the digital and green transition: rail manufacturing and railway workers' perspectives

2.1 Employment

Employment is going to be highly impacted by the transition, as the progressive digitalisation, automation and growth of the sector will require a prepared workforce in the following years.

The railway sector is already experiencing a **shortage of workers**. In April 2023, the European Transport Workers' Federation highlighted a lack of staff for trains, especially with regard to train drivers²⁶³. Such a reduction of staff is leading to a stressful situation for the remaining workers, who find themselves dealing with situations of psychological burn-out due to the burden of responsibilities to be handled with so few staff. In addition, there is an increasing open **competition between different sectors to attract talents** – especially in IT, engineering, software specialists, etc. This contributes to the difficulty in recruiting and retaining employees to the sector.

Attracting young workers is probably one of the most crucial issues for the sector²⁶⁴, due to multiple factors:

- ▶ widespread **perception of railway as a sector that is “frozen in time”**²⁶⁵, as well as a **lack of self-promotion** to attract young talent²⁶⁶;
- ▶ **negative perceptions** about entering the industry, especially when coming from different sectors – which is and will be the result of the progressive modal shift outlined above;
- ▶ the fact that **jobs in the railway sector are not perceived as secure and stable as they were before**²⁶⁷: additionally, according to a report from Shift2Rail in 2019, the future technological challenges are also expected to increase the perception of the industry's instability²⁶⁸.

The present situation will be intensified by the transition, as new jobs will emerge while others will disappear. To give some examples from both manufacturing and transport, the European Rail Skills Alliance, under the European Blueprint project 'STAFFER' in 2021, published a comprehensive list of roles that will be prominent in the future²⁶⁹. On the operational and rail transport side (encompassing the subsectors of traffic management, intelligent transportation systems and mobility as a service), the predicted future roles are as follows²⁷⁰:

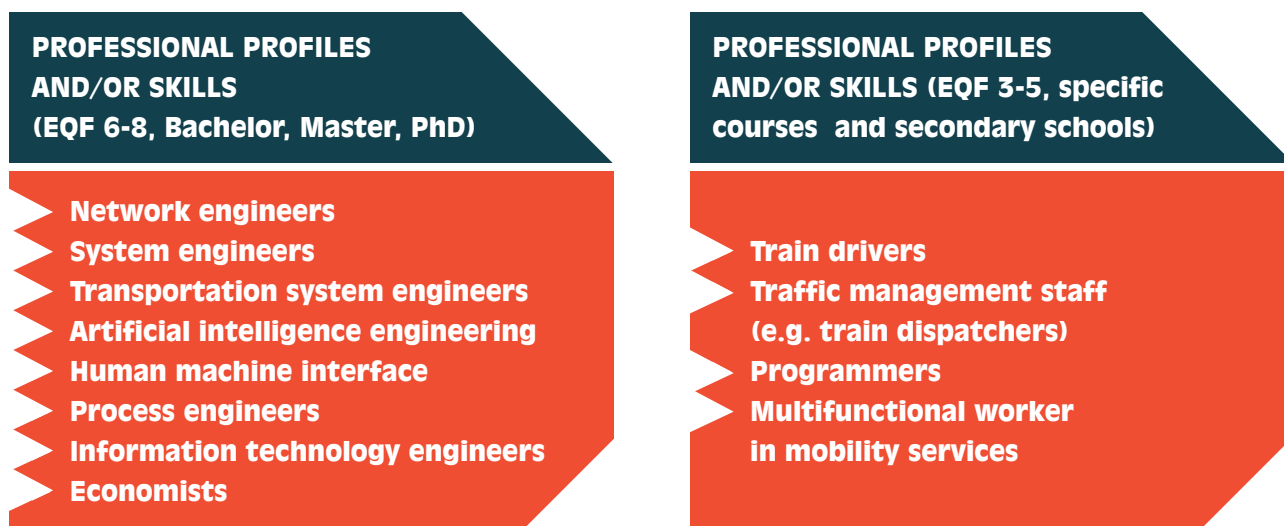


Figure 20: Future occupational profiles for operational and rail transport²⁷¹

As we can see from the table above, some roles – such as ticketing sales and customer service – are not considered for the future²⁷². On the manufacturing side, future jobs can be divided between rail supply manufacturing and maintenance/asset management, as shown in the tables below:

► For rail supply manufacturing:

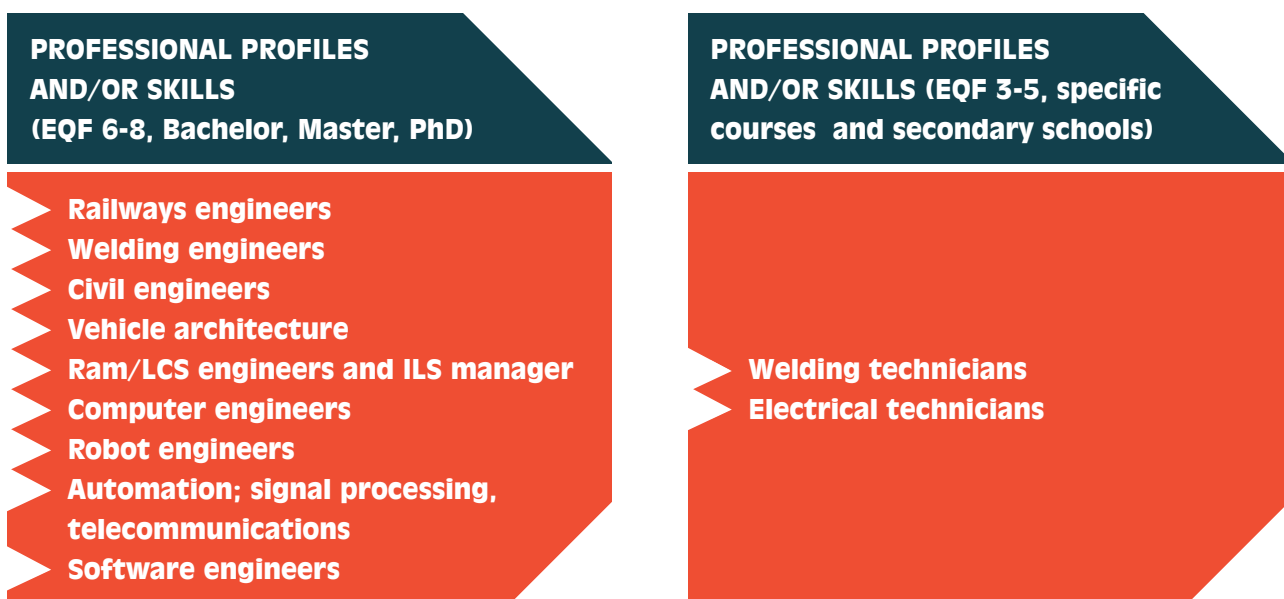


Figure 21: Future occupational profiles for rail supply manufacturing²⁷³

263. ETF, *Rail industry worker shortage crisis: Why better working conditions are vital*, <https://www.etf-europe.org/rail-industry-worker-shortage-crisis-why-better-working-conditions-are-vital/>, 14 April 2023.
 264. CER (the Voice of European Railways), ETF [et al.], *Employability in the Rail Sector in Light of Digitalisation and Automation (EDA rail)*, August 2022. Available at: <https://www.etf-europe.org/wp-content/uploads/2022/09/Employability-in-the-Rail-Sector-in-Light-of-Digitalisation-and-Automation-EN.pdf>
 265. Geormaneanu P., *How can young people be attracted to the rail industry*, 21 March 2019. Available at: <https://www.linkedin.com/pulse/how-can-young-people-attracted-rail-industry-paul-geormaneanu/>.
 266. Global Railway Review, *Q&A with Network Rail's Simon Kendler: Diversity and inclusion in rail*, <https://www.globalrailwayreview.com/article/144478/qa-with-simon-kendler-diversity-and-inclusion-in-rail/>, 26 May 2023.
 267. ETF and IndustriAll Europe JT4 Mobility Workshop of 1 February 2023.
 268. Shift2Rail, *Bridging the Skills Gap for the Rail Sector: Analysis of Six Measurements and Recommendations*, April 2019, p. 27. Available at: https://rail-research.europa.eu/wp-content/uploads/2019/07/Human-Capital-Report-Series_Bridging-the-skills-gap.pdf.
 269. STAFFER European Rail Skills Alliance, *Future vision of the rail sector from the point of view of the rail supply industry*, 10 June 2021. Available at: https://www.railstaffer.eu/wp-content/uploads/2022/09/D3.1-Future-vision-of-the-rail-sector-from-the-point-of-view-of-the-rail-supply_PUBLIC.pdf.
 270. Ibid., p. 27.
 271. Ibid.
 272. ETF and IndustriAll Europe JT4 Mobility Workshop presentations of 1 February 2023.
 273. STAFFER European Rail Skills Alliance, *Future vision of the rail sector from the point of view of the rail supply industry*, 10 June 2021, p. 28.

► For maintenance/asset management:

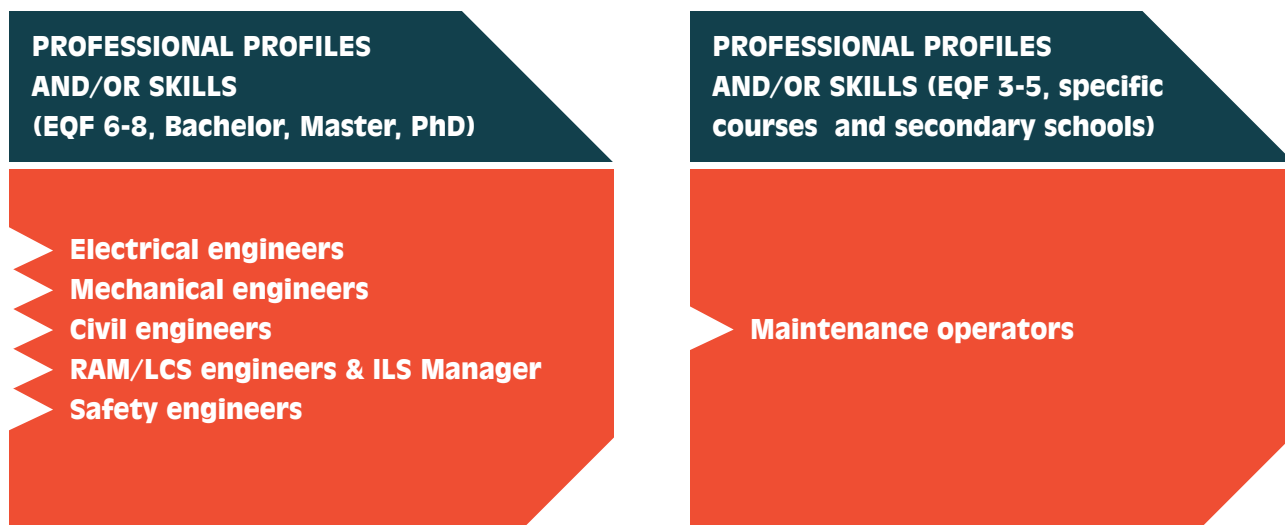


Figure 22: Future occupational profiles for maintenance/asset management²⁷⁴

It is important to state that such future statistics are still quite uncertain, as the situation strongly depends on the European country. The 2019 Shift2Rail report underlined this uncertainty²⁷⁵, especially with regard to the ageing workforce in specific countries. To give two examples²⁷⁶: Germany will probably have to hire many new staff as the current workforce in the sector is ageing: already in 2020, Deutsche Bahn, the country's national railway company, envisaged recruitment of around 100,000 new employees in the years ahead²⁷⁷; and France has been dealing with the consequences of an ageing workforce during the last decades and generational replacement has already been put in place.

2.2 Skills

The railway sector is already struggling to attract workers with the necessary skills, and this will be intensified by the required green and digital transformations with a **strong need to up/reskill**²⁷⁸. Skills shortages on the manufacturing side mostly relate to the shift towards the use of ICT systems, materials and production processes; whereas at the level of competence, most of the changes are correlated with the Science, Technology, Engineering and Mathematics (STEM) jobs, together with new social, communicative and organisational demands²⁷⁹.

For railway workers, the increased use of new train control and operation systems will mean that drivers will have to acquire new sets of skills to be able to cope with such developments. In fact, even if some trains will be able to run without drivers, there will still be the need to ensure jobs for staff to manually operate or remote-control the train for security reasons²⁸⁰. But, at the same time, this process will probably also involve the need to hire new train drivers with more expertise in how trains work, being complete experts in all parts of this rolling stock²⁸¹. A fuller picture is provided by a recent survey from the EU STAFFER project²⁸² showing the job profiles that are expected to meet most up/reskilling and adaptation needs. As we can see from the pie chart below, engineers lead the way, followed by digital/IT staff and technicians.

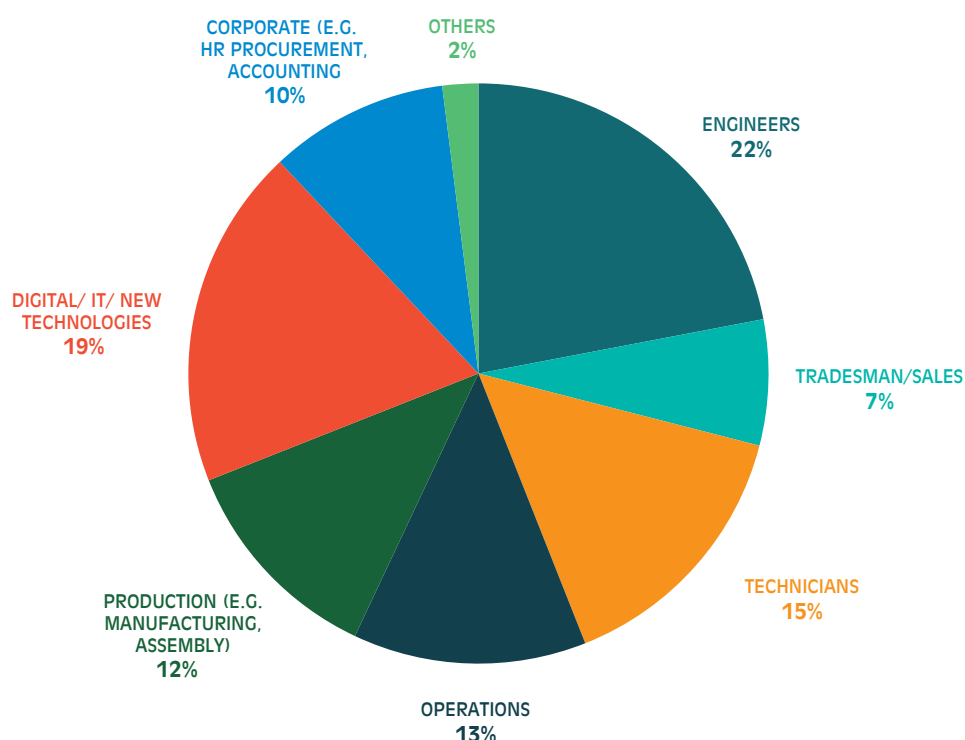


Figure 23: Occupational groups/working areas for which respondents saw the greatest need for skills adaptation²⁸³

In addition, as the up/reskilling process requires huge commitments from employers, it is important to guarantee that those investing in skills are not disadvantaged. A standardised training mechanism could be a solution in this sense, combining the need to up/reskill together with a means of guarantee for companies.

A smooth transition shall also consider constant contact and **integrated approaches with education and training institutions** to prepare the future workforce. The above project reports that there are still no concrete mapping exercises for graduates entering the world of work, which leads to very difficult workforce planning.

It is important to affirm that the progressive need for an up/reskilling process can only be smoothly implemented if certain points relating to the area of employment are addressed. First, the fact that workers are gradually ageing creates an empty space in terms of the workforce that will have to be filled in the coming years, leading to the need to assess the essential competences of a more digital, green and automated sector²⁸⁴. Secondly, on the topic of attractiveness: as new skills are required, workers have to undergo specific training, which they will only do if they perceive the sector to be attractive, secure and stable. Lastly, as modal shift occurs and retraining is needed, workers will need to overcome some of the perceptions and resistance that stop them from entering the sector and abandoning their previous workplace.

274. Ibid.

275. Shift2Rail, *Bridging the Skills Gap for the Rail Sector: Analysis of Six Measurements and Recommendations*, April 2019, p. 2.

276. Ibid.

277. RailTech, *Deutsche Bahn hires 25,000 new employees*, <https://www.railtech.com/policy/2020/02/13/deutsche-bahn-hires-25000-new-staff/>, 13 February 2020.

278. STAFFER project, *European rail alliance discusses long-term strategy to address skill shortages in the sector*, <https://www.railstaffer.eu/news/european-rail-alliance-discusses-long-term-strategy-to-address-skill-shortages-in-the-sector/>, 14 October 2022.

279. Shift2Rail, *Bridging the Skills Gap for the Rail Sector: Analysis of Six Measurements and Recommendations*, April 2019, initial summary.

280. Ibid., p. 24.

281. Ibid.

282. STAFFER European Rail Skills Alliance, *Future vision of the rail sector from the point of view of the rail supply industry*, 10 June 2021, p. 33.

283. Ibid.

284. Ibid.

2.3 Working conditions

Working conditions are crucial, first to create a more attractive sector: **work shifts, work during unsocial hours, insecure contracts and bad salaries** impact negatively on the sectoral image, especially for railway workers²⁸⁵, where the lack of **work-life balance** is even more prominent²⁸⁶. In this sense, social conditionality of EU funds shall be applied to ensure support of high-quality jobs. A more attractive sector can also focus on **promoting a culture of professionalism** among young people: new generations want to be specialists of their work and can commit if they see an impact on what they actually do.

Another point worth mentioning is the **gender imbalance** in the sector's workforce, both from transport and manufacturing. Currently only 20% of railway workers are women, a low percentage which was even lower before 2013, and which has slightly increased thanks to the spread of awareness of the topic²⁸⁷. UNIFE, on the manufacturing side, also reported that the railway sector "has historically encountered an unbalanced gender representation"²⁸⁸, leading this association to develop measures to include women in the sector²⁸⁹.

Even if it is a double-edged sword, an improvement in working conditions can come from the **digitalisation process** if we look at the topic of safety²⁹⁰. The European rail sector is partly built on antiquated legacy systems that are becoming more difficult to maintain, resulting in obsolete trackside technology and interlocking types that are more than a century old²⁹¹. Automated interlocking, train dispatching and incident handling are going to offer benefits of capacity, efficiency and safety for manufacturers, operators, regulators and passengers²⁹². However, it should be specified that some activities, such as the coupling and decoupling of rolling stock in a freight train, can still pose some risks²⁹³: Digital Automatic Coupling (DAC), a mechanism to boost efficiency and reduce health and safety risks for workers can still lead to serious hazards, such as electric shocks and risk of injury, due to the bumping during manual uncoupling or other malfunctions²⁹⁴.

Another aspect of how digitalisation can influence working conditions is the growth of "**hybrid-work**", due to advanced communication infrastructure and digital tools. Hybrid work will result in new organisational structures that can sensibly change existing hierarchies, redefine the traditional roles and consequently create new job relations. According to the EDA project²⁹⁵, this will impact the professional culture in the railway sector, giving space to delegation and decentralisation of responsibilities that may challenge the traditional organisational structures and the workers involved²⁹⁶.

Lastly, digitalisation also poses some threats regarding the cybersecurity macro topic²⁹⁷: very important in a context of a digitalised railway sector, the exposure of sensitive and personal data to possible cyberattacks from hackers, organised crime or intelligence services could lead to serious risks. Additional to the data leakages, events deriving from cybermanipulation, such as taking over remote control, could endanger the safety of workers and passengers²⁹⁸.

285. CER (the Voice of European Railways), ETF [et al.], *Employability in the Rail Sector in Light of Digitalisation and Automation (EDA rail)*, August 2022, p. 20.

286. *Ibid.*, p. 43.

287. ETF, *Promoting women's employment in rail*, <https://www.etf-europe.org/activity/women-in-rail/>, accessed 9 June 2023.

288. UNIFE, *A woman's place is in Rail!*, <https://www.unife.org/news/a-womans-place-is-in-rail/>, 15 February 2023. 289 See section 3 below: "Sectoral recommendations and best practices".

290. CER (the Voice of European Railways), ETF [et al.], *Employability in the Rail Sector in Light of Digitalisation and Automation (EDA rail)*, August 2022, p. 11.

291. McKinsey & Company, *Digitizing Europe's railways: A call to action*, December 2020, p. 2.

Available at: <https://www.mckinsey.com/featured-insights/europe/digitizing-europes-railways-a-call-to-action#/>.

292. *Ibid.*

293. CER (the Voice of European Railways), ETF [et al.], *Employability in the Rail Sector in Light of Digitalisation and Automation (EDA rail)*, August 2022, p. 30.

294. *Ibid.*

295. *Ibid.*, p. 61.

296. *Ibid.*

297. Global Railway Review, *Cyber-security for rail: Embarking on a safe journey towards digitalisation*, <https://www.globalrailwayreview.com/article/114512/cyber-security-rail-journey-digitalisation/>, 11 January 2021.

298. *Ibid.*

3. The way forward: main common opportunities, challenges and best practices

The decarbonisation pathway is a must, but it is a journey that will bring opportunities and challenges, giving rise to a series of trends in employment, skills required and working conditions to be monitored to ensure a Just Transition for workers.

Rail can take advantage of its strategic role in greening the transport system. The report demonstrates that **both rail manufacturing and railway workers have several commonalities** and very few sectoral differences when it comes to the main trends and impacts of the transition. A common strategy is therefore even more encouraged, and the role of social dialogue is vital to ensure a fair transition for all workers, leading to a common understanding and joint decision-making. At European level, existing social dialogue covers passenger rail transport (including local trains), rail freight transport and operation of rail infrastructure; and involves social partners such as the European Transport Workers' Federation (ETF), the Community of European Railway and Infrastructure Companies (CER) and the European Rail Infrastructure Managers (EIM).

A Just Transition for rail manufacturing and railway workers includes the following outstanding points:

AT POLICY LEVEL

- ▶ Giving rail the strategic role it deserves for the green transition of transport, by advocating for a concrete policy and strategy that promotes cooperation instead of unsuccessful competition
- ▶ Emphasising the need for investments/financing at EU and public level to renovate infrastructure, purchase new rolling stock and push for innovation and interoperability
- ▶ the future of implementable alternative fuels and technologies
- ▶ Promoting social dialogue
- ▶ Ensuring a level playing field with other transport sectors
- ▶ Encouraging intermodal cooperation to identify how to tackle the issue of last mile delivery

AT EMPLOYMENT AND SKILLS LEVEL:

- ▶ Developing tools to efficiently anticipate and manage job transitions and workers' mobility
- ▶ Financing up/reskilling of workers towards green and digital, including flexible pathways
- ▶ More involvement and cooperation with training and education to design updated/innovative programmes and to attract young people
- ▶ Assessing the future skills needed and the future challenges of the sector to delineate specific (and successful) plans of action

AT WORKING CONDITIONS LEVEL:

- ▶ Establishing Just Transition rules/standards/practices to ensure workers' decent working conditions and quality jobs that involve dignity, stable employment and decent protection and wages
- ▶ Making the sector attractive to new workers to ensure sufficient levels of staffing and decrease work pressure
- ▶ Addressing the challenge and opportunities of digitalisation in terms of health and safety
- ▶ Promoting the entry of women in the sector, by spreading information on the available positions and on their career possibilities in this context to consequently achieve a better gender balance

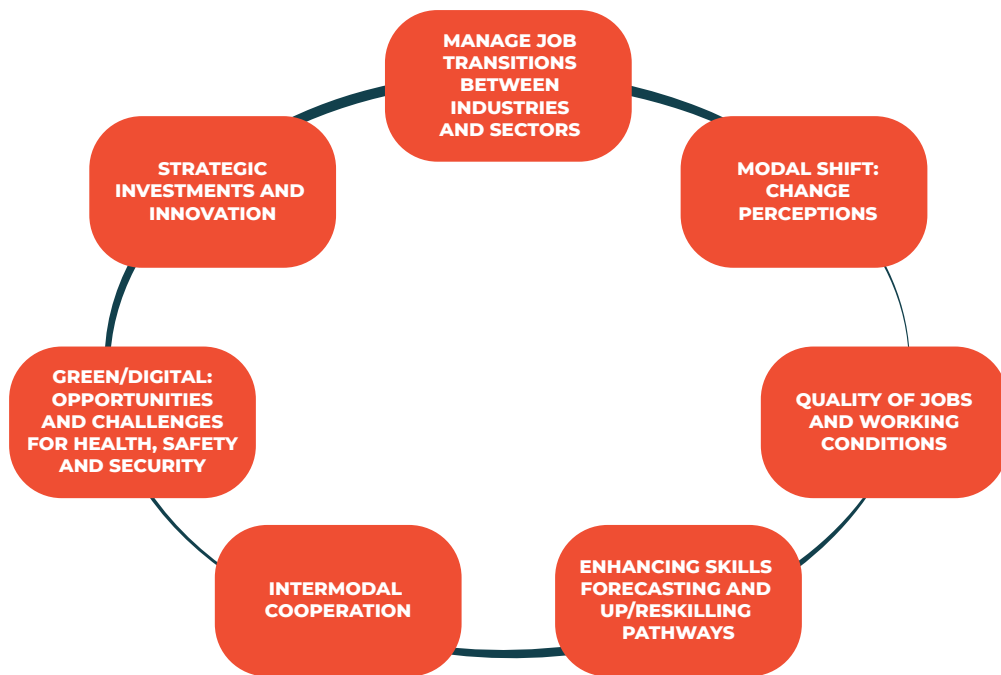


Figure 24: Ensuring a Just Transition for the railway sector: main common action points

There are already some best practices and studies conducted at EU and extra-EU levels which should be considered, as their application and replication can be extremely useful in ensuring the fairest possible harmonisation of the transition. The table below gives some examples:

BEST PRACTICE	DESCRIPTION	WHERE
STAFFER project ²⁹⁹	The STAFFER EU Blueprint project is aimed at developing training and education paths for the current railway workforce, as well as curricula for students based on current and future skills and competence needs for the whole rail sector.	EU level
Network Rail ³⁰⁰	Network Rail is an organisation which operates by repairing and developing the UK railway infrastructure. Network Rail developed a safety central dedicated site for railway professionals by publishing work-safe communications to help workers in the railway industry to avoid the possible health and safety risks of operating in railway infrastructure.	UK
UNIFE Gender Equity Policy ³⁰¹	The association announced the Gender Equity Policy in 2022. The policy is aimed at increasing equity to raise the sectoral performance, reiterating suppliers' obligation to address these divides.	EU level
ETF Joint Agreement on Women in Rail ³⁰²	The ETF and CER have carried out joint studies in recent years and decided in 2018 to enter negotiations to establish an autonomous agreement aimed at promoting employment of women in the sector. The Autonomous Agreement on Women in Rail, aimed at promoting the employment of women in the sector, was officially signed in November 2021.	EU level

Table 8: Best practices in the railway sector

299. European Rail Skills Alliance, *European Erasmus+ project to train skills for the future of railways*, <https://www.railstaffer.eu/news/european-erasmus-project-to-train-skills-for-the-future-of-railways/>, 3 December 2020.

300. Network Rail, *everyone home safe every day. Lifesaving Rules and Worksafe*, 2022. Available at: https://safety.networkrail.co.uk/wp-content/uploads/2022/08/001329-Lifesaving-Rules_Worksafe-Interim-Toolkit75.pdf

301. UNIFE, *A woman's place is in Rail*, <https://www.unife.org/news/a-womans-place-is-in-rail/>, 15 February 2023.

302. ETF, *Promoting women's employment in rail*, <https://www.etf-europe.org/activity/women-in-rail/>, accessed 3 July 2023.

CONCLUSIONS

The JT4Mobility project has seen the collaboration of IndustriAll European Trade Union and the European Transport Workers' Federation (ETF) with a view to addressing the social consequences of the decarbonisation of transport and to ensuring a positive and fair transition for workers across the mobility ecosystem. The project has included the participation of the technical partner Spin360 and various stakeholders, external experts and trade union representatives to ensure a constructive dialogue that could bring together useful insights into the current situation and on the future opportunities and challenges to be tackled to ensure a Just Transition.

The present study has collected evidence from research, interviews and workshops, and represents the starting point for future joint actions relating to the Just Transition. The project has been instrumental in showing how, although they come to the situation from different perspectives, manufacturing and transport workers actually have many needs in common in terms of the future of employment, the skills required in the digital and green era, and working conditions that need to be guaranteed to enable a fair transition. Workers on both sides, albeit with some natural basic differences, are inclined to demand social sustainability: fair conditions, social security, safe workplaces, an up/reskilling pathway to properly manage new technologies, and gender equality.

It is essential to ensure that the environmental and social dimensions of sustainability do not run in parallel but complement each other. The work undertaken in this project is a stepping stone to achieving key goals that will ensure that the transition benefits everyone, and makes a vital contribution towards fully understanding what needs to be worked on, both now and in the future.

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2. Aerospace/Aviation sector workshop site visit to Sonaca, Charleroi, 30 June 2023
3. Road sector workshop, site visit to MAN Trucks, Niepolomice, Poland, 26 April 2023
4. Railway sector workshop, Cologne, Germany, 28 June 2023
5. Shipbuilding sector workshop site visit, Santurtzi, Spain, 16 June 2023
6. Aerospace/Aviation sector workshop site visit, Sonaca, Charleroi, 30 June 2023





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